AUG 23 1921
Medical Lib.

Vol. II AUGUST, 1921 No. 2

THE AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY

EDITORIAL BOARD

CHANNING W. BARRETT
C. L. BONIFIELD
J. WESLEY BOVEE
W. W. CHIPMAN
JOHN G. CLARK
H. S. CROSSEN
THOMAS CULLEN
EDWARD P. DAVIS
J. B. DELEE
ROBERT L. DICKINSON
PALMER FINDLEY
ROBERT T. FRANK
GEORGE GELLHORN
ALBERT GOLDSPOHN
WILLIAM P. GRAVES
HERMAN E. HAYD
BARTON C. HIRST
E. J. ILL
J. C. LITZENBERG
F. W. LYNCH
FRANKLIN H. MARTIN
C. JEFF MILLER
GEO. C. MOSHER
HENRY P. NEUMAN
GEO. H. NOBLE
REUBEN PETERSON
JOHN OSBORN POLAK
F. F. SIMPSON
HENRY SCHWARZ
J. M. SLEMONS
HOWARD C. TAYLOR
THOMAS J. WATKINS
B. P. WATSON
GEORGE GRAY WARD, JR.
J. WHITRIDGE WILLIAMS
E. GUSTAV ZINKE

REPRESENTING
THE AMERICAN GYNECOLOGICAL SOCIETY
THE AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS, AND ABDOMINAL SURGEONS
THE OBSTETRICAL SOCIETIES OF NEW YORK, PHILADELPHIA, BROOKLYN

Editor, GEORGE W. KOSMAK
Associate Editor, HUGO EHRENFEST

Published Monthly by
THE C. V. MOSBY COMPANY
ST. LOUIS

Foreign Depots:

HIRSHFELD BROS. Ltd., London, England.
STIRLING & COMPANY, Melbourne, Australia.
EMILE BOUSAULT, Paris, France.
EDWARD EVANS & SONS, Ltd., Shanghai, China
McAINSH & COMPANY, Ltd., Toronto, Canada
MARUZEN COMPANY, Ltd., Tokyo, Japan.

(Entered as Second-Class Matter October 28, 1920, at the Post Office at St. Louis, Mo., under the Act of March 3, 1879).

for GYNECOLOGISTS and OBSTETRICIANS

Neet

Sterile, antiseptic, non-irritant.

A bland alkaline cream that removes hair without irritating the skin.

Relieves patient of the discomfort and risk attending the use of a razor.

Incoming growth is slower to reach the surface than if shaved, and is softer and finer than growth following use of a razor.

A liberal trial sample with complete instructions for use will be mailed without charge to any physician requesting it.

HANNIBAL PHARMACAL COMPANY—St. Louis, Mo.

Germori

Improved "Rothstein" Formula **Non-Poisonous Antiseptic**

Belonging to the class of the "Chinosol"

Formula

C_5H_4N, OSO_3K, $C_6H_{11}CH:Ch(CH_2)$ $COOH$.
Al_2O_1 $4C_2$ H_2O_2 + $4H_2O$, $NaHCO_3$ H_3 BO_3

Gynecologists will be interested in this new preparation made in tablet form.

Germori Tablet dissolves immediately and produces a dense foam containing CO_2. The vaginal folds are flattened out so that the medicament reaches all parts of the mucosa; the lumen of the vagina will be closed for 25 to 30 minutes; the therapeutic action of the different chemicals will be in constant action on the mucosa of the vagina.

It is indicated in Vaginitis Vulvae, Pruritus, and Pruritus Ani.

In cases of venereal and other catarrhal conditions of the vagina, apply three tablets at one time for three days; after which a microscopical examination will usually show the vaginal secretions to be free of all germs. Germori Tablet shows very favorable results in chronic cases of Dysmenorrhea.

Germori Tablet is an ethical medicinal preparation.

Samples supplied on application.

Germori Co., Ltd.

Jas. Gibson, Selling Agt. **2915 University St.** **St. Louis, Mo.**

The American Journal of Obstetrics and Gynecology

VOL. II. ST. LOUIS, AUGUST, 1921 NO. 2

Original Communications

AMERICAN GYNECOLOGY*

AN APPRECIATION

BY W. W. CHIPMAN, M.D., MONTREAL, QUE.

FORTY-FIVE years ago this Society was formed, and Fordyce Barker was the first occupant of this Chair. At the Inaugural Meeting Thomas Addis Emmet read the first paper; and Robert Barnes of London, an Honorary Fellow, was a distinguished guest.

Of the thirty-nine founders, twenty-eight were present, and there were three guests from Canada,—Trenholme of Montreal, Hodder of Toronto, and Rosebrugh of Hamilton.

The president's address closed with these words:—"Let me express the hope that this Society may command the approval of the highest and most cultivated judgment of the scientific world, and not incur the reproach which Job in his bitterness uttered, 'Ye are all physicians of no value.'"

So, in that memorable year in your country's history, that hundredth year of your national life, this Society was born. And as a Society it has lived, and lived to a full measure of its gift. On its Fellowship Roll are to be found the great national and international names of its time, the builders everywhere; men who have obeyed to the last behest the terms of the Constitution:—"to promote knowledge in all that relates to the Diseases of Women and to Obstetrics." At no time and from no man has this Society incurred the odium of Job's reproach.

*President's address, read at the forty-sixth annual meeting of the American Gynecological Society, Swampscott, Mass., June 2 to 4, 1921.

NOTE: The editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

Among these names there are seven from the Dominion of Canada, seven names that bear witness to a generous recognition. And by a very gracious mandate a Canadian now sits in this Chair, and the McDowell gavel, for the first time in its history, is in the keeping of a neighbor.

Gentlemen of this Society, may I first thank you for this great honor. I thank you on my own behalf, on behalf of McGill University, and the country which I represent.

My first duty is the sad one of recalling to your minds the deaths of the Fellows during the year.

Five of our Honorary Fellows have been gathered to their fathers:—Benjamin F. Baer, on the eleventh day of last September; John C. Reeve, four days later; Matthew D. Mann, on March 3rd of the present year; Joseph Taber Johnson, on the fifteenth day of the same month; Bache McE. Emmet on May 30th; only four days ago.

These men had all passed the limit set by the Psalmist, and they died, full of honors, as full of years. This Society owes much, not only to their professional attainments, but also to their character and work.

Benjamin R. Schenck, of Detroit, died on June 30th, a month after our last meeting. For nine years he had been an Active Fellow of this Society. His untimely death, at the early age of forty-eight, cut short at noonday the abundant promise of his life's work.

I have chosen as the subject of my address "American Gynecology," and I have called it "An Appreciation." In the truest sense it is an appreciation, for it is an attempt to portray in their proper order of time and place, the large and signal contributions which America has made to this great specialty. This picture will be very broadly drawn, at somewhat of the friendly distance between Canada and the United States, and with the freedom of a neighborly perspective.

I shall include, of course, obstetrics; for gynecology and obstetrics are not only linked together in this Society, but they are copartners from the very nature of the business. Obstetrics has been, from the beginning; and shall continue, I take it, to the end. If it is important to be in the world at all, the matter and the manner of our entrance are a first consideration. With this universal, this world-immigration, gynecology must always be concerned, for it maintains the health and repair of this birth-entrance. Born as she was in the early days of the ninteenth century, gynecology is no longer "rocked in the obstetric cradle, sucking the withered ancestral finger," but has already reached the stature of a full womanhood. "A daughter still in her mother's house, she is mistress in her own" in Kipling's paraphrase expresses best the relationship that should exist between these two subjects.

Thucydides said of the ancient Greeks that they "possessed the

power of thinking before they acted, and of acting too"; and it is just the power of thinking and of acting that has set its seal upon this later Magna Graecia,—our own America. This is our large inheritance from the modern Greek, the Anglo-Saxon race; it explains indeed our own existence, and why we are gathered here today, near that famous Colonial city of this larger Agrigentum.

I shall not urge again the parallel that is so often drawn between Greece with her Mediterranean Colonies, and Britain, with what Sir William Osler called "her greater Britain." This analogy that makes our first Atlantic sea-board the Sicily of the Greeks is sufficiently exact, for in that Colonial period this great country was born, and received its birthright, the gift of thought and action of the English race. The Pilgrim Fathers and the Virginia Company changed their sky, it is true, but they changed neither their character nor their characteristics. They brought with them their own race qualities, a courage, a practical sense, an energy in work and, above all, a love of freedom. And they stamped these as a seal upon us, a lasting impress; for through chance and change we are, and we always will be, an English-speaking and an English-thinking race.

And the New World has but strengthened and accentuated these racial characteristics. Assuredly there was a large house to put in order and abundant need of energy, originality, and self-reliance. And so, from the beginning, and through necessity of inheritance and environment, these have come to be the essential quality of our national genius.

Let us now see what all this has done for the growth and development of American medicine, and particularly as it pertains to our own specialty. As we shall learn, it is a remarkable story and, along certain lines, a wondrous achievement. It is a record of but three centuries, for only three hundred years ago Giles Firman, Samuel Fuller, and John Winthrop practiced medicine in Massachusetts; while Lawrence Bohun and John Pott were the first physicians in Virginia. They not only practiced medicine, but they took an active share in civil life; or, like the apostle, Luke, they preached the gospel, the "angelical conjunction" of Cotton Mather. Giles Firman was our first medical teacher, as usual, underpaid; for, later on, he took orders, finding Physic "but a meane help."

These men and their successors were our first emigrant physicians, men of sterling worth, "and of constant if not warm affections." They practiced the medicine of their time, William Harvey had just discovered the circulation of the blood, and obstetrics was the concern only of the friendly midwife.

These emigrant physicians were chiefly from Great Britain and, as time went on, they trained their sons as their "apprentices," and sent them back for their degrees to Edinburgh and London.

A wonderful band of men, even from the beginning, were these native-born apprentices! For it was they who, in due time, founded our medical schools, and really created American medicine. Of such were John Morgan, Benjamin Rush, William Shippen, Jr., Samuel Bard, Caspar Wistar, Philip Syng Physick, John Warren, and James Lloyd. The very names are enough to recall their greatness. We read of William Shippen, Jr., that he was the first professor of obstetrics in our earliest medical school of Pennsylvania, and that he taught also anatomy and surgery there. "In providing a convenient lodging, under the care of an honest, sober matron, for poor lying-in women, he established the first Maternity Hospital." Dr. Samuel Bard, Professor of Physic, in King's College, afterwards Columbia, wrote our first textbook on obstetrics; and James Lloyd, an eminent surgeon, using ligatures instead of the searing cautery, was the first in Massachusetts to devote himself wholly to this subject. Benjamin Rush is justly named the American Sydenham; and Philip Syng Physick, who introduced the absorbable ligature, is called rightly the Father of American Surgery.

These were great men, and they lived in an auspicious time, for the revival of medicine in England, in the 18th century, was at its height. They all had worked and studied with John Hunter, the greatest scientist since the time of Aristotle; the one, be it remembered, a Greek, and the son of the Stagira physician, twenty centuries before, and the other a Scot, the son of the Calderwood laird. They had studied also with the great brother, William Hunter, the founder of scientific obstetrics; with William Smellie, his teacher, with Cheselden, and Pott; they knew as friends and teachers Heberden, John Fothergill, Lettsom, and Thomas Dover. Seven of them were graduates of the University of Edinburgh, where they sat under the Monroes, Cullen, and John Bell. From these men they had learned, by precept and example, they had gathered from them wisdom and experience, and lifelong friendships were formed here which even the War of the Revolution could not sever or destroy.

And so at this time and in this way were laid the foundations in America of medicine, surgery, and obstetrics. Morgan, Shippen, Physick, and Rush were in a manner the great prophets, the forerunners to prepare the way for the illustrious achievements that were soon to follow.

These achievements embrace the brilliant history of American surgery, especially in the domain of the pelvis and the abdomen; and these we owe largely to the founders of operative gynecology, McDowell and Sims.

Ovariotomy it was that made possible all abdominal surgery, and so now let us trace shortly the origin of this idea and its achievement.

The famous story runs that Ephraim McDowell was born in Virginia, March 11, 1771. In 1793, the year of John Hunter's death, he went to Edinburgh, and sat for a year under John Bell, through whose eloquent teaching he was early impressed with the hopeless state of women afflicted with ovarian disease. He did not take his degree, but in the following year returned to the village of Danville, Kentucky, bringing with him, no doubt, the teaching of the time in respect of "Ovarian Hydatids."

This teaching may be summarized as follows. William Hunter, forty years before, had said, "I am of opinion an excision can hardly be attempted, and the trocar is the only palliative;" while John Hunter in characteristic phrase, pronounced that, "if taken in their incipient stage 'hydatids of the ovary' might be taken out. There is no reason why women should not bear spaying as well as other animals." John Bell's teaching stated, "I hope success may attend this operation!" This, if you like, was the birth of the idea, and this idea it remained for McDowell to carry into execution. And so, in Danville, on the thirteenth day of December, 1809, this great operation was first executed. "I am but an instrument in Thy hands," was McDowell's prayer on that December morning, and an efficient instrument he proved himself to be. So was given to the world an operation, the value and far-reaching effect of which can never be overestimated.

By this operation the gates were set ajar to the opening of a new surgical life. But these gates were slow to open, and we remember with pride today the names of Nathan Smith, David Rogers, the brothers Atlee, Edmund Peaslee, Burnham, Kimball, and Dunlap. It needed courage in those preanesthetic days, for the operation was condemned by the profession as being "cruel, barbarous, and unjustifiable," while among the laity, the operator was designated as "a butcher, a murderer, or as a cross between the two." In forty years but thirty-six operations had been performed at the price of fifteen lives; and we can scarcely wonder that but eighteen surgeons had essayed the undertaking. The brothers Atlee will always stand among our foremost surgeons; John was the older, and the pioneer; but Washington L. the more distinguished. The latter made the record of his time, of 387 operations for "ovarian dropsy." Peaslee came later with his improved technic, and the larger number of recoveries; he was the first to use the normal salt solution, or "artificial serum," as he called it; and, above all, he was an excellent exponent. His work on "Ovarian Tumors," published in 1872, embraced the knowledge of the time, and made him and his country famous. In this classic, the names of Charles Clay of Manchester, who gave us the word ovariotomy, and Spencer Wells of London are generously remembered; indeed, the latter is named in the dedication of the book, "the greatest of ovariotomists."

The first step is the most important, even in major surgery, and there now follow but successive steps. Even the surgeon of today may mistake a soft uterine "fibroid" for a firm ovarian cyst, and it matters little to the patient as regards her safety. But how different the case in 1853 when Walter Burnham of Lowell, instead of an ovarian cyst delivered through his incision an enlarged uterus with its fibroid! What was worse, it could not be replaced; and he was compelled to amputate where he could, this courageous, if reluctant, pioneer. But the honor of the first case, deliberately undertaken, fell to his fellow-townsman, Gilman Kimball.

So was launched the hysterectomy; and, one by one, the increasing difficulties, reaping where ovariotomy had sown, were successfully undertaken. It was all largely the work of the same hands, for we find here Kimball, Burnham, the two Atlees, Peaslee, and Thomas. At first the pediculated tumor only was removed,—a myomectomy; and, in selected cases, for greater safety, the vaginal route was chosen. The younger Atlee, in a Prize Essay, awarded by the American Medical Association, described, in 1853, a vaginal myomectomy, which he began on the eighth of May, and continued at different times, removing the tumor piecemeal,—our first morcellement. He regrets the death of the patient, from pneumonia, in July.

But from the first, the abdominal route was usually preferred.

And now, to these courageous pioneers and their long-suffering patients, there came as a veritable gift from heaven, the general use of Morton's ether anesthesia. Discovered seven years before, the happy word itself is the gift of Oliver Wendell Holmes and Weir Mitchell poetically defines its slumber as "the death of pain."

The names of Marcy, Emmet, Jones, Eastman, Stimson, Byford, Baer, Pryor, and Kelly must always be remembered in the evolution of hysterectomy. One and all, they gave important contributions to make it the perfect operation that it is today.

And at first it must have required a great determination, for we learn from Kimball, in 1853, that in a first eleven hysterectomies, there were but six recoveries. And in this development we do not forget the work in Germany of Gustav Simon, Hegar, Billroth, and Schroeder; and in France, that of Koeberle, Velpeau, and Pean. It was of Velpeau, you remember, that the Breakfast-Table Autocrat said, "a good sound head over a pair of wooden shoes is better than a wooden head over feet in calfskin;" while Pean's name will remain as the inventor of the "artery forceps." But the greatest credit of this operation belongs in all truth to America; and, in recognition of this, Thomas Keith, in dedicating his Monograph on Hysterectomy to Skene of Brooklyn, said, "I offer you something that is not mine, but is of American origin * * * for the first case of uterine fibroid diagnosed before operation, was removed by my old friend, Dr. Kimball."

The gates of abdominal surgery were by this time thrown widely open.

And now let us consider vaginal plastic surgery, a second great achievement.

Emerson has said, "when Nature has work to do, she creates a genius to do it." Certainly Nature did not fail us here, for she gave us Marion Sims.

Until this time, our specialty had barely lived through a struggling adolescence, for while Recamier, in 1801, by the use of his speculum, his sound, and his curette, had at least imparted to it accurate observation; and while, later, Sir James Simpson and Huguier had added substance and stature to its growth; it only came of age with Marion Sims. It remained for him to definitely establish it.

It was in 1855 that the Woman's Hospital, New York, was opened by this Alabama surgeon. This was the first special hospital for women, and the scope of gynecology at the time may be inferred from the speeches of the opposition. Dr. Meredith Reese, a prominent physician, contended that anyone could apply nitrate of silver through a cylindrical speculum; that an astringent injection would cure a leucorrhea; and that there was little dfficulty in fitting a Physick globe pessary for a prolapse. He but voiced the recognized limitations, and where was the need of a special hospital!

It remained for Marion Sims to change all this. His preparation had been entirely original and self-taught, in a small hospital of his own in Alabama. The world knows the accident of the pewter spoon as a hardware speculum, his consequent success with bladder fistulæ, and the indifferent health which sent him to New York. "I had no influence and no friends; I said to myself, 'I am a lost man unless I get some one to create a place where I can show the world what I am capable of doing.'" To its lasting credit, New York gave him the place, it gave him a hospital, with Sister Margaret and Thomas Emmet.

To the treatment of these fistulæ, Sims brought in addition to his native genius, three special things: (1) the duck-bill speculum; (2) the funnel form of denudation; and (3) the use of silver wire as sutures. And with these he changed the whole picture from a previous succession of dismal failures to nearly a uniform success.

His principles and methods were speedily adopted, not only in America, but throughout the world. Even on his first visit to Europe, in 1861, his reputation had preceded him, and his advice and skill were everywhere invoked. Honors met him at every turn, and for a time he cared for the late Empress Eugenie at Saint-Cloud. His first book, "Clinical Notes on Uterine Surgery," is really a Genesis, for it distinguishes him at once as the founder of our specialty. But specialist as he was he was also a great generalist, for as an army surgeon

he served with distinction in the Franco-Prussian War, embodying his experiences in a second great contribution, "The Careful Invasion of the Peritoneal Cavity for * * * All Intra-peritoneal Conditions." His was the greatest reputation ever achieved by an American surgeon. His statue in bronze stands in Bryant Park, New York, erected by his "Professional Friends, Loving Patients, and Many Admirers throughout the World."

Gynecology stands debtor for all time to Marion Sims.

His work, so admirably begun, was ably carried on and further developed by Emmet, Nathan Bozeman (also of Alabama), by Ferguson, E. C. Dudley, Goodell, and Storer. Emmet was undoubtedly the greatest of these. In addition to his abdominal work, he devised an excellent plastic operation for cystocele, rectocele, and complete perineal tear; while his name, alongside of Schroeder's will remain in our literature for the repair of cervical laceration.

These, then, were the two great paths—the one first travelled by McDowell and the other by Marion Sims—along which our special surgery has developed. These two paths found their junction in the work of Emmet, Gaillard Thomas, Charles P. Noble, and Howard Kelly, men whose work marks the first milestone on the great highway.

The history of obstetrics in America will always be associated with the name of Oliver Wendell Holmes. We read that he practiced medicine but a few years, and enjoyed only a fair practice, and yet he was the first to recognize the contagious nature of puerperal fever. In a paper, "On the Contagiousness of Puerperal Fever," published in 1843, when he was thirty-four, he showed that this "contagium" was carried from one patient to another. He re-asserted this belief in a second paper, "Puerperal Fever as a Private Pestilence," and so pointed the direction of the way; the way of Semmelweiss, in 1847, who declared that the hands carried particles of "decomposed animal matter" into the puerperal wound; and the way of Pasteur, the famous Dean at Lille, who, ten years later, established his famous formula of fermentation, and showed that "a virus might consist of microscopic beings." This was the way that led to Joseph Lister, in 1867; for Listerism, it will always be conceded, was the most important application of Pasteur's work.

Before this time the history of obstetrics in America is the commonplace story of its academic and clinical establishment,—its gradual emancipation from the hands of the midwives. It was the old world wide struggle of the obstetrician against prejudice, false modesty, and tradition.

In France, you remember, as early as the 17th century, Jules Clement had been called to attend in her confinement, La Valliere, mistress of the Grand Monarque; and the title "Accoucheur" is bequeathed

to us for his services; while it was William Hunter in England who was the first man to attend at such a time one of England's queens. In America, as late as 1840, Samuel Gregory of Boston is still found inveighing strongly against the "danger and the immorality" of employing men in midwifery.

The men engaged on this emancipation were, from the beginning, the writers and the teachers of the subject; William Shippen, Samuel Bard, Thomas James, Walter Channing, William Potts Dewees, J. W. Francis, C. D. Meigs, and H. L. Hodge. Dewees was an able writer, and the strongest clinician of his time; and we are told that so popular was he in this emancipation of his subject, that the ladies were accustomed to delay their confinements when he was out of town. Hodge gave us his famous pessary, rivalled only by that of Albert Smith; and he published in 1864 his excellent work "The Principles and Practice of Obstetrics." He and Meigs were eminent clinicians and great teachers; yet they were both bitterly opposed to the contagion theory of Holmes, and they denied the use of ether during labor as "it made the patient drunk, and no self-respecting woman would place herself under such an influence." Ether in parturition was first used by Sir James Simpson in 1847, and later in the same year by Keep and Channing of Boston.

As early as 1807 John Stearns had given us the important contribution to obstetrical therapeutics, "The Medicinal Use of Ergot."

While the first cesarean section in America was performed by John Lambert at Newton, Ohio, in 1827, such operations were few, sporadic, and undertaken *in extremis*. The first elective case was performed by Lusk only in 1887, five years after the appearance of Saenger's monograph. Gaillard Thomas, in 1870, executed for the first time in America a laparoelytrotomy, the sound surgical principles of which have been lately vindicated by the various forms of extraperitoneal section. The epoch-making observations of Emil Noeggerath, "Latent Gonorrhea in Women," were published in 1872, five years before Neisser identified the organism.

True it is, and natural enough, that obstetrics had scarcely kept pace with her brilliant surgical offspring. Even the voice of Oliver Wendell Holmes was for long the voice of one crying in the wilderness, and it remained for Tarnier to first employ Lister's carbolic solution in obstetrics.

As we have seen, Lister published his first report in 1867, but it was more than a decade of years before his great principles were generally accepted. For a time he was certainly a prophet without honor in his own country. James Chadwick tells us that he saw Lister operate in 1873, and that "swayed by the scoffings of my preceptors, I failed to grasp the significance of his principles."

Lister's scientific vindication came from Germany, with the work of Robert Koch, in 1876, the natal year of this Society.

With the founding of this Society, obstetricis and gynecology were definitely linked together, the future lay in experienced and skilled hands, and the subsequent story is written in its Transactions.

It is true that the days of the large adventure were over, but the problems of the new inheritance lay everywhere before us.

One by one these problems have been taken up and investigated. Some few have been solved, their solution but discovering a wider world to conquer.

It is interesting to follow here the history of pelvic hematocele; its gradual recognition as an extrauterine gestation through the studies of John S. Parry, Eastman, Joseph Price and Webster. At this time Lawson Tait was in the midst of his vigorous work in Birmingham.

Much of our knowledge of pelvic infection is written here. Battey described his operation in the first volume of the Transactions; and the recognition and surgical treatment of tubal disease was largely the work of the brothers Price, of Johnstone and Dudley. The long and bitter quarrel between pelvic peritonitis and cellulitis was really settled by Gaillard Thomas.

With the decline of the pessary craze the uterus was no longer, in the words of Clifford Allbutt, "impaled on a stem, or perched on a twig." There developed instead the operations for its suspension, the work of Howard Kelly, Gilliam, Simpson, and Webster Baldy. England gave us the Alexander-Adams, and the method of Olshausen came from Germany.

Cesarean section has been variously modified, and its wider indications more clearly defined by Peterson, Davis, Hirst, Newell, and Edgar. The narrower claims of pubiotomy have been measured, and valuable chapters added to the etiology and treatment of the toxemias of pregnancy and puerperal infection.

Important studies have been made in the anatomy of the pelvic floor, noticeably by R. T. Frank; while new and more scientific methods for its repair have been advanced by Babcock, J. Riddle Goffe, Studdiford, and Ward. In this work the flap-splitting methods of Lawson Tait and Hegar have been justly incorporated, and the Wertheim-Watkins' interposition operation has found, in selected cases, a definite place.

Cancer of the uterus has remained an unsolved problem, despite the efforts of Byrne, Emil Ries, Werder, and John G. Clark. Wertheim's results from Vienna roused only vain expectations; and the use of radium is even now undergoing the test of experience.

In 1880, Skene of Brooklyn described the "latent infection" in the suburethral glands, now known by his name; and chief among the

other scientific contributions have been those of Whitridge Williams, Cullen, Reynolds, Taussig, Charles Norris, Brettauer, Gellhorn, Ehrenfest, and Sampson.

As we have seen, it is the work of three centuries.

During these three hundred years there have been three great revivals in medicine: The British, the French, and the German. America has partaken largely from them, has assimilated and made her own the grand ideas of Hunter, of Pasteur, and of Virchow; and the great name of Lister must be added to these. During this time America has herself contributed generously, for she has given anesthesia, together with rich gifts of surgical achievement.

Through all this long inheritance she has steadily pursued her practical, individual way, adapting means to ends, and developing the particular measure of her gift.

And now that her great house is fairly put in order, the time is ripe for more leisurely thought, more concentrated study. The signs of the times are made manifest by the Carnegie and Rockefeller Foundations, the establishment of laboratories, with rich scholarships and endowments. Medical education in its widest sense is an urgent question, and the thoughtful address of Dickinson, our last year's President, has already shown us something of the way.

What it all comes to is this, that we have already contributed to medicine large and handsome gifts of practical things; our time has been largely spent in action. For the future we must concern ourselves with special thinking and research. For it is only with a right conjunction of special thought with action, of science with art, that we can become a growing point, the great growing point of the coming century. It is by taking thought that we shall now add to our stature.

285 Mountain Street.

THE UNSOLVED PROBLEMS IN GYNECOLOGY AND OBSTETRICS*

By W. Blair Bell, B.S., M.D. (Lond.), Liverpool, England

TODAY gynecology and obstetrics stand high among the developments of surgery along scientific and specialized lines; yet, the more I think of this, the greater is my wonderment that it should be so. It seems such a short while since our specialties were struggling towards the light.

When, therefore, I received your invitation to read a paper before this learned society it occurred to me that it might not be inappropriate if I were to consider for a few moments the principal avenue through which approach may be made to the secrets still hidden from us and the personnel and equipment required for the task.

I do not think there can be any doubt that the collective status of the gynecologists and obstetricians of the world in regard to clinical acumen and surgical technique is nearing the limit which must be set to human achievement, and that the same will soon obtain in regard to the bacteriological aspects of our special subjects. But in contradistinction to this must be placed the unsatisfactory character of our advancement, the slow progress we are making, in the more essentially biological, including biochemical, problems, connected not only with the normal morphology and physiology of the female genitalia, but also with the pathological developments that may be associated with the structure and function of the reproductive organs. Concerning the actual details of these problems I shall have but little to say, except by way of illustration.

First, let me consider how far our present methods of education are conducive to the correct mental attitude of the future investigator—whether they are methods that stimulate the powers of perception—and make every student an interested observer from the beginning.

It is a curious commentary on the value of the allied sciences to the surgeon of today, that there is a growing tendency—at any rate in my own country—to minimize the importance of biology and to urge the superior—I might almost say 'exclusive'—claims of the final hospital study; and this attitude is not confined to the student. This seems to me unfortunate, for it means that we are catering entirely for men of moderate intelligence and not at all for those on whom may fall the responsibility of sustaining progress in our science.

---

*Read by invitation at the Forty-sixth Annual Meeting of the American Gynecological Society, June 3, 1921.

As a result of our existing methods, the clinical aspects of gynecology and obstetrics have been thoroughly illuminated, as I have said, while the more abstruse biological features are but very imperfectly understood and their claims hardly realized. It may be argued that there are many expert physiologists, biochemists and comparative anatomists, and this is true, but alone they cannot help us because they do not yet know our difficulties, neither have they the clinical nor technical knowledge with which to guide their steps. Up to the present the teaching of elementary gynecological anatomy and physiology has been conducted by the clinical instructor, because these subjects have been almost invariably ignored by the physiologist and anatomist. This means, generally speaking, that expert physiologists and anatomists have remained in more or less complete ignorance of these matters, and are, therefore, even now unaware of the hiatuses in our knowledge.

There can be no doubt, I think, that the man who continually has to face difficulties in practice is the one most likely to find the means of circumventing them, provided he have sufficient all-round knowledge and adequate facilities for his task. It is only natural, however, that each should turn his attention to those matters concerning which he is best informed. It is obvious, therefore, that if the many biological problems connected with gynecology and obstetrics, which so far have baffled us, are to be elucidated, we must modify the general plan of education in regard to those who may perchance attempt to throw light on what is now obscure and indistinct.

In attempting to indicate the direction in which improvement may be made, I shall doubtless merely give verbal form to what must already have taken shape in the minds of many.

In our educational methods, we are too apt, I think, to set store on detail. We should, I believe, aim at encouraging a comprehensive and inclusive outlook. We destroy originality by overloading the young mind with so-called facts which often are the easily deducible results of observation. Again, it seems to me that the different subjects of the general curriculum are taught in too disjointed and exclusive a manner. As gynecologists and obstetricians we should have the right—and the same applies to teachers in the other branches of final medical study—of defining the subject-matter of the physiological and anatomical courses. The anatomist should be required to demonstrate and to teach comparative and human anatomy on the lines we desire, and the physiologist should be obliged to lead, by experiment and demonstration in the laboratory, more directly to what will be taught later in regard to the human subject. There must, in fact, be more coördination throughout. It would be better, for instance, if the key-subject, biology, were taught in such a way as to make the student realize that in it Man is included in a wide generalization with the lower animals, and that Man is but the evolutionary physio-

logical and morphological climax. The student should be more definitely impressed with the knowledge that in his biological and biochemical studies he is watching the evolution of Man, that he is following the simple to the complex, and that what may be normal at one stage is pathologic in a higher state of evolution—that hermaphroditism, for example, is normal in the earthworm but abnormal in Man. If the student could be imbued with some conception of the ultimate value of all his biological work, and could be taught not to look upon it as a separate and isolated obstacle to arrest his onward course, not only would his hospital studies be more interesting and more relatively important, but also his mental attitude and outlook would be as much fitted for the investigation of biological as for the study of purely clinical problems.

The present trend, then, of medical education in Great Britain has been towards the production of good clinicians, rather than of men with their minds alive to the biological, morphological and physiological, including biochemical, import of the phenomena they observe.

I often wonder how far this question has been realized in America—this training of the student towards a wider scientific mentality. In Great Britain, where general practitioners are now being urged to coöperate in an investigation concerning the beginnings of disease, it is clear that there is a need of reform in our methods of education if we are to expect results on the lines I have indicated.

Supposing, however, that the student has been educated on these principles, in what circumstances and in what environment will he find inspiration and obtain the best results?

The establishment and success of clinical units and of units for group-study in North America and Canada may provide the answer. Their foundation is, of course, open to the interpretation that these systems have been brought into existence because the brain of the average intelligent man is incapable of grasping and understanding all the side-issues that go to make up the sum of medical knowledge; and I have heard it stated by an advocate of them that this is their *raison d'etre*. Moreover, it is said that only in them can material properly be utilized and the one-line worker find an immediate use for his output. While the last part of this statement is true, I cannot agree entirely with the first. A properly educated man of wide perception is not necessarily a man of encyclopedic knowledge, but, rather, one whose mind is so saturated with basic principles that the mosaic of detail falls into an orderly pattern under the influence of his prescient intelligence. A man with the index type of mind is rarely original, and is not, therefore, necessarily worthy of encouragement. I have already referred to this in regard to the education of the student.

Hunters and Pasteurs are, of course, born, not made, but I believe that useful imitations can be developed by proper education and training,—imitations good enough, in the helpful environment of which I have just spoken, to obtain results. Because the great biological and medical discoveries in the past have emanated from the brains of men ploughing a lonely furrow, there is no inherent reason why men of similar intellect should not again arise and in the more perfect environment that can be assured today unravel the outstanding questions. Meanwhile it should be possible now for men of lesser ability with proper education and in a helpful environment to surmount difficulties which the master-minds of the past, with their more limited opportunities, could not overcome.

I would once more urge the importance, so well recognized in this country, of clinical work going hand in hand with scientific laboratory investigations. You have many wise foundations for this purpose, whereas we are sadly handicapped for want of them.

In this continent there is offered to the well-educated man every opportunity for attacking these problems at a living wage; but in Great Britain we cannot always secure the best men for the service of science, for we are unable to offer them a reasonable financial reward, a reward in any way commensurate with that to be obtained from practice. This is a matter that is exercising us greatly, for times are changing, and while clinical matters are so well established that they can take care of themselves, there is urgent need that further progress, which, as I have stated, is largely biological, should not be crippled and hampered for want of proper organization in teaching and postgraduate research.

If, then, the last ramparts of gynecological and obstetrical diseases are to be captured we must modify to some extent our methods of education and we must bring correlation, breadth, and inspiration into the musty empiricism of the preliminary studies. I know the curriculum is overcrowded, but it is mostly with what could well be spared. We must, also, encourage scientific enterprise, and, after educating our students for their lifework, give them the opportunity of utilizing their talents and of advancing the science of obstetrics and gynecology.

I shall now endeavour briefly to substantiate my statement that the great outstanding problems in gynecology and obstetrics are biological in the narrowest sense of the word.

MORPHOLOGICAL PROBLEMS

The development of the human ovary can now be described with a considerable degree of certainty, but the same cannot be said in regard to that of the genital passages. To what factors, for instance, is

due the fusion of the Müllerian ducts in the genital cord? This is of considerable importance in connection with the common so-called malformations of the uterus and vagina. Professor Wood Jones, who has done so much excellent work on the comparative anatomy of the genital organs, believes that we should look upon these conditions of imperfect union as atavisms rather than malformations; and in this light the comparative anatomy of the genitalia becomes both interesting and instructive. Indeed, it is from this point of view alone that information can be obtained. If serial sections be cut of the divided and uniting uterine horns in various species of rodentia and carnivora, all the later stages in the development of the human uterus may be seen. Moreover, it will be made clear that the human uterus has morphologically but two muscular coats, not three, as usually described. Nevertheless, we do not yet know what determines the final development of the human uterus, and we can hardly expect to know until we have decided definitely what are the variations in the factors that lead to the different degrees of Müllerian union that are normal, constant phenomena in closely related animals. In rodentia there may be seen the complete didelphic condition with double vagina (viscacha) and the gradual evolution to the single vagina and bicornute uterus (aguti).

Again, can the peritoneal pouch that encloses the ovarian extremity of the tube and ovary itself, a structure seen in certain rodents, and, as I have found in a less complete form in hedgehogs, be passed over as a freak structure, in spite of the fact that, as Bland-Sutton has shown, it may exist as an atavism in woman? It seems to me that a structure so useful to fertilization and conception is worthy of serious study, especially from the point of view of the state of peritoneal currents and other influences in the creatures concerned. An investigation concerning the nature of the secretion of these sacs would also be of considerable interest.

Let me take another matter which, possibly, is of more clinical importance. How far are we familiar with the causes of the irregularities in the female bony pelvis, apart from those resulting from gross postnatal disease, such as rickets? We talk about civilization, athletics and the rest, but what causes a generally contracted pelvis in a well-developed non-rachitic woman who has been guilty of none of the enterprises that militate against functional perfection.

The work of Whitridge Williams and others has demonstrated beyond reasonable doubt that the typical funnel-shaped pelvis is associated with high assimilation, but I do not think the cause of high assimilation is definitely known. Such an important matter, especially in this country, is deserving of extensive systematic investigation. Comparative racial studies, in which different races were examined in their natural environments, might throw considerable light on this and on other pelvic ab-

normalities, for there can be no doubt that civilization may greatly affect structure as well as function.

As a last morphological point of interest, albeit there are many others, let me say that I look forward to the day when some gynecologist or obstetrician will give us the clue to the mode of origin of pathological neoplasms. After all, the gynecologist and obstetrician has, time and again, given a lead to the rest of the profession, and in the problem to which I refer he is on his own ground, for his work is chiefly concerned with the preservation of the structures and functions through the medium of which neoplastic developments normally occur.

PHYSIOLOGICAL PROBLEMS

It is within the last twenty years that practically all the recognized facts concerning the female functions have been discovered. We now know, if I may quote one of my own aphorisms, that a woman is a woman on account of all her internal secretions, and not only because she possesses ovaries. But we still lack certain evidence as to the nature of the controlling force that determines the primary sex-characteristics of the person concerned; nor do we know how it comes about that even in the course of development a conjunction of sex-characteristics may occur—a condition of hermaphroditism. Even if it be that the masculinity or femininity balance of the internal secretions is disturbed, this is still an effect, not a cause. That this fascinating and intricate problem is capable of solution I am convinced. It may well be the life-work of some one capable of estimating the gradual changes through the numerous classes of creatures that indicate the evolutionary origin of Man, of some comparative morphologist with all the histological technique of the present at his disposal on which to graft new methods of observation; and then, when the gross serial steps have been demonstrated, he may perchance gain an inkling of that on which they depend—an inkling of the forces which imbue the fertilized ovum of Man with maleness and femaleness.

There are few, surely, who cannot recognize today the vast importance of femaleness as opposed to maleness, and few, too, who are not conversant with the essential physiological, that is to say, biochemical, differences that influence the mind and body.

We have, too, some knowledge of what constitutes puberty. It is, we believe, the time of life when the metabolism has met the claims of somatic growth. The potentiality of a girl's metabolic resources, especially in regard to the calcium salts, at this time is such that it can support the strain of reproduction and all that this involves. But we do not know what happens at puberty to start the new train of events. What is the hormone that makes the ovary aware of the situation; is it then that the genital functions of the ductless glands come into being, and, if so, what leads to this awakening? That it is not a habit of life

is too obvious to need discussion: it is due, rather, to a series of chemical events closely connected, as I believe with the calcium metabolism that may be altered and delayed by many circumstances of nutrition and environment.

Then again, have we established without the possibility of fallacy the nature of menstruation? My view that it is an excretory process in regard to the principal elements required during pregnancy for the building up of the fetus, and during lactation for the formation of milk, as is made evident by the calcium metabolism, requires full confirmation and elaboration in regard to the exact part played by the ovaries and other internal secretions.

To pass on, I would ask whether there is general agreement concerning the factors involved in the production of the climacteric? I myself, for instance, disagree with those who think that the normal menopause is the result of primary ovarian atrophy, although many of the phenomena of the menopause are due to this change. The fact that the artificial menopause is produced by oöphorectomy has been a blind to all of us. If the ovaries are removed from a young woman with protracted amenorrhea and ovarian insufficiency, menopausal symptoms do not supervene. The artificial menopause is induced only when there has been preexisting ovarian activity. At the commencement of the normal menopause the ovaries are normal and active; indeed, at the end of that phenomenon the woman may be capable of conception. Why it is that ovarian substance or extract of any kind, and in any combination whatever and however administered, does not produce specific results at the physiological menopause, whereas whole gland ovarian substance, especially in association with thyroid substance, gives relief in cases in which the menopause has been induced by operative procedures? There are some, I know, who will dispute this; but I believe the facts, as I have stated them, to be true. From this jumble—shall I say?—of observations, it appears justifiable to ask you to consider as a working hypothesis for further investigations the view that there is at the climacteric some substance circulating in the blood, some natural biochemical toxin, or something withdrawn from it, which leads not only to ovarian atrophy but also to the other physiological and structural alterations that take place at the 'change of life.'

Another group of important correlated functions about which we know but little is that concerned with fertilization and conception. I think that light will soon be shed on that curious anomaly I call 'selective sterility.' In view of recent additions to our knowledge in regard to the incompatibility of the blood of persons in different groups, it is not unlikely that selective sterility, as well as successful homoplastic, as opposed to autoplastic, ovarian grafting, will be found to depend on a similar phenomenon. I have observed, however, that a

difference in the blood-grouping of married couples has no direct relation to the possibility, or otherwise, of conception.

Again, the normal interrelations that exist between the mother and the fetus *in utero* have been studied to some purpose; but we are still ignorant of the way in which the growing embryo controls the development of the chorionic epithelium that sometimes takes on such disastrous activity when the control is removed.

I do not think the theory that in such circumstances there is lutein over-growth is sufficient, for it is common to see vesicular mole and chorionepithelioma without abnormal lutein development.

Moreover, how little we know concerning the toxemias of pregnancy! Before we can arrive at any proper idea of the disturbance produced, we must know far more intimately the normal metabolic mechanism concerned and the maternal forces that are marshalled against the deleterious effects produced by what is, after all, a new growth in the uterus. If the recent work of Dold and Obata concerning eclampsia be correct, as seems possible, we shall be placed in possession of very interesting information concerning a biological phenomenon of vast importance, for I do not doubt that, if it be fully confirmed, we shall be able to test the blood of every pregnant woman before so serious a condition as eclampsia supervenes and to treat her with normal human serum. I have myself seen excellent results with blood-transfusion.

Although hundreds of thousands of human beings are expelled from the uterus daily, we have but a faint glimmering of the biochemical factors leading to the termination of parturition. Is it a gradual or sudden increase in the infundibulin content of the blood? And what of lactation? Is the mechanism of the simple nature I have described in the 'Sex Complex'? If so, we are little in advance of the ancients who, owing to their powers of perception, have always been worthy of consideration in matters of priority.

Such gynecological and obstetrical problems seem to me almost infinite when I let my mind wander around the outposts of our small impregnable position of certain knowledge. I have, however, today the desire to emphasize not only the importance of these unsolved problems, which we all admit, but also the essential biological nature of them. I have attempted, too, to show that our education tends to drive us forward almost entirely along the deeply trodden paths rather than along those barely to be seen or yet uncut through virgin country. I would plead, therefore, that our students and our postgraduates be more broadly educated at least in the great principles of biology, for I believe that only by way of physiological, especially biochemical, research, and by the comparative study of simpler forms of structure shall we be able to bring our art towards scientific perfection.

THE FREQUENCY AND CAUSE OF ABORTION

By Arthur William Meyer, M.D., Palo Alto, Cal.

From the Carnegie Laboratory of Embryology and the Department of Anatomy of the Stanford Medical School

ONE need only to regard the question of abortion historically and recall the practices of primitive races, to be reminded of the fact that in such a matter as this, human custom, conduct and frailty play a very large rôle. Nor need attention be directed to the practices of primitive or uncivilized peoples. Robinson (1919) for example, estimated that 1,000,000 criminal abortions are performed annually in the United States. However, since the annual number of births in the United States, estimated on the basis of the registration area, is only about 2,400,000 this would imply that one criminal abortion is performed for every two and a half births. Or to put it another way, if somewhat less than 40 per cent of all pregnancies terminate prematurely, as Pearson (1906) estimated, then, according to Robinson, one out of every four pregnancies is terminated *criminally*.

The highest estimates of the ratio of interrupted to uninterrupted pregnancies are those of Taussig (1910) and myself. Those of Taussig were based upon the experience at a St. Louis gynecological clinic, and mine upon about 700 selected histories accompanying specimens in the Carnegie Embryological Collection. From these data it seems that there is one abortion to 1.7-2.3 pregnancies. Hence, if we accept Robinson's estimate of the incidence of criminal abortion in the United States as one to every 2.4 births, it would follow that in the women considered by Taussig or myself, about 50 per cent of all pregnancies which terminated prematurely were terminated criminally! Furthermore, upon the basis of Pearson's estimated prenatal mortality, the criminally induced would somewhat exceed this percentage and upon the basis of Mall's earlier estimate of a prenatal mortality of about 20 per cent, the criminal abortions in the United States, as estimated by Robinson, actually would exceed the grand total of abortions from all causes.

It is regrettable that we are left partly to surmise the exact incidence of prenatal death. Ahlfeld (1898), estimated that there is one abortion for every four or five normal births. This would be one to every five or six pregnancies. Hegar (1863), estimated that one out of eight or ten pregnancies ends prematurely. Michailoff (1897), as reported by Chazan (1904), gave a frequency of 10.18 per cent, and Keyssner, (1895), a frequency of 15.1 per cent. The latter estimate of one abortion to about every 6.6 births, is concurred in also by Wil-

liams (1916), who placed its incidence somewhat higher, or one abortion in every five or six births. According to Chazan, and Lechler (1883), this was the figure reached also by Busch and Moser (1840), upon theoretical grounds alone, although Pearson (1906) decided for a mortality of 37.6 per cent, or one abortion in every 2.7 pregnancies, upon the same basis.

Since the causes responsible for postnatal mortality differ so widely from those which operate before birth, it is unlikely, however, that a curve of adult mortality, if extended through prenatal life back to conception, as done by Busch and Moser and by Pearson, would represent the facts. Indeed, it could do so only by the merest chance for the curve of postnatal mortality is based upon a totally different set of conditions. Besides, it undoubtedly is true that the rate of mortality varies from month to month in prenatal, much as it does from decade to decade in postnatal life, although probably in a totally different way. It could fail to do so only if a perfect uniformity in conditions obtained throughout the period of gestation.

Mall (1917), regarded Pearson's estimate as too low. This opinion of Mall would seem to be confirmed by Taussig (1910), who, from data obtained in 201 gynecological dispensary patients, concluded that there was one abortion to every 2.3 pregnancies, a mortality of 43.4 per cent; and also by the present series of almost 700 cases, which indicates a prenatal mortality of 58 per cent. However, Stumpf (1892), found one abortion for every 3.56 pregnancies, a mortality of but 28 per cent, and Keyssner still less, or one abortion in 9 pregnancies or a mortality of but 11 per cent.

If we accept the statement of certain social workers or propagandists, who allege that a conservative estimate of the total number of criminal abortions annually performed in the United States is 250,000, then on the basis of Pearson, about one in every 6; and on the basis of Mall's earlier estimate, one in every three interrupted pregnancies, is terminated criminally. These estimates are not confirmed, however, by Taussig, (1910), who on the basis of histories obtained from 293 patients at a St. Louis gynecological dispensary reported that only 36 out of 371, or approximately 10 per cent of the abortions in these women were admittedly mechanical. The histories in the Carnegie Embryological Collection present evidence similar to that of Taussig, but these percentages undoubtedly must be regarded as too low, for reasons that will occur to everyone. However, it should not be overlooked that the surprisingly high percentages of prenatal mortality in the above women undoubtedly do not represent the actual life conditions of the whole population. At best they merely indicate the conditions in women who have aborted. How much the inclusion of all those women who never had aborted would have lowered these percentages it is impossible to say, but one scarcely can doubt that this lowering

would be considerable. After a fuller consideration of the literature, Schultz (1921), estimated the prenatal mortality among the general population at 22 per cent, a figure somewhat higher than Mall's earlier, but considerable below his later estimate.

Since the women in the present series do not constitute a dispensary group, but very largely also represent cases in private practice, one cannot contemplate the amazing prenatal mortality revealed by these data without the profoundest concern, not alone because of its effect upon the birth rate, but also because of its relation to the wellbeing of the women wholly aside from the question of morals. Nor can one be quite certain that the indicated antenatal mortality is on the decrease or that it is high in these women alone. Malin (1903), for example, believed that abortion is more common among the economically more fortunate classes. This opinion seems to be shared also by others. Nothing even remotely like it seems to be known in the case of the domestic animals except in such conditions as contagious abortion. Aside from this affection, abortion in some domestic animals seems to be a rather rare phenomenon, having occurred, according to Malins, but 131 times in a series of pregnancies which resulted in 3710 living colts. This is a ratio of only one abortion to every 29.1 pregnancies or less than one seventeenth the frequency in the women of the present series.

But it is very clear that we lack sufficient data upon which to base reliable opinions regarding these matters. Social workers undoubtedly far overestimate the prevalence of criminal abortion, though it should at once be admitted that the professional obstetricians very likely underestimate its frequency, for their opinion is based upon a rather different experience. However, that the estimate of the former is entirely too high can be shown also by their estimate of deaths of mothers ascribed to abortion. It has been stated publicly, for example, by enthusiasts for birth control, that there are 8,000 deaths due to abortions annually in New York alone, and 50,000 in the entire country. Since the total number of deaths from all causes among all women between the ages of 15 and 40, regardless of whether they are childbearing women or not, as estimated on the basis of the registration area according to the U. S. Census for 1916, was only 139,642, one-third of all deaths in women of these ages, according to birth control advocates, was due to criminal abortion!

No mention was made of the occurrence of previous abortion in 11.4 per cent of the 697 selected cases considered more fully here because the clinical histories were quite complete and apparently reliable, However, only three cases among 697 were specifically stated to have suffered no previous abortions. In the rest of the 11.4 per cent the matter was not recorded. Only one of these three women had borne children and the remaining two were recorded as neither having had previous abortions nor children. This small percentage of women who had

not aborted stands in marked contrast to the findings of Malins (1903), who stated that 63.4 per cent of the women in a selected series of 2,000 hospital and private cases had not aborted before.

Malins, who found 14.2 per cent sterile women in a series of 2,000 selected private and hospital cases, stated that only 3.1 per cent of these had aborted or were childless.

Although it is not recorded in 78 cases in the present series whether the women had either children or abortions, one cannot assume that they had neither, otherwise the percentage of primiparae in this series would be 11.4 as compared to 4.86 per cent in the series of Franz (1898). Graefe (1896) found only two out of 38 cases in primiparae, of 5.5 per cent, and stated that Lithauer found only one such case! However, such small groups as these cannot contribute anything of statistical value except when combined. Out of Hellier's series of 1890 married women belonging to the laboring classes, 184, or over 10 per cent, never had been pregnant before, and 1616, or 89.2 per cent—had one or more previous abortions. The latter was true in 92.9 per cent of the cases in the Carnegie series, and although repeated abortions occurred in a considerable percentage of these women, only 5.6 per cent had aborted more than five times.

The above 78 cases also represent the women in this series of 697 cases who may not have aborted previously, that is, before they came to the attention of the Carnegie Laboratory. However, all of them had aborted once or they manifestly would not be represented in this series from the Carnegie Collection. The only exceptions to this statement may be formed by a few instances of spurious pregnancy in which hemorrhage or membranous dysmenorrhea or hypertrophy of the endometrium may have been taken for genuine evidence of pregnancy because of the irregularity in the menstrual history.

A single previous abortion had occurred in 56.6 per cent of 608 cases, and two previous abortions in 22.9 per cent. About 79 per cent of this series, as contrasted with the 66 per cent of Stumpf's series of 446 cases, had aborted once or twice previously and 69.1 per cent once or twice only. Hence the great majority of the specimens in the present series came from cases of first and second abortions. However, one should, I presume, recall in this connection that it always is easy for a woman to say that she has aborted only once or not at all. Yet the records probably are not very defective in this regard for, as will appear later, most of the women were relatively young.

Since 394 out of 692 women, or 56.9 per cent, aborted before the beginning of the fourth month of gestation, it is evident that most of the conceptuses from this series are small. Only three of these women aborted during the last two months and 78.6 per cent before the beginning of the fifth month. The marked increase in the frequency of abortion from the first to the second month, as well as the marked

decrease from the sixth to the seventh month, is not without significance. The same factor probably is at least partially responsible for both. Knowledge confirmatory of the fact that she is pregnant would come to a woman with advent of the second month, while the viability of the fetus or even fetal movements, would act as a deterrent to interference with the gestation especially from the sixth month on.

Only 33.4 per cent of the women of this series aborted in the third month, as compared to 59 per cent in the series of Dührssen (1887), and to 42.7 per cent of Franz's 1842 cases taken from the first seven months of gestation. Since only three of the present series of 692 cases aborted during the last two months and only 14 during the last three months, it is quite immaterial whether or not the cases in this series from the last three months are included, for 98.2 per cent aborted before the seventh month. Although Franz stated that only 15.45 per cent of the cases collected by him had aborted before the 28th week, the summary given at the end of his paper would seem to make this percentage 76.9 per cent, which compares fairly well with the 98.2 per cent found in this series.

That no existing collection of specimens or of histories correctly represents the actual facts in the world at large, would seem to be indicated by a comparison of the results obtained by different investigators. With the exception of the results of Stumpf and myself and some of those of Lechler, for the third, fifth, sixth and seventh months, the divergences are striking,—probably irreconcilable,— and suggest that a far larger series of cases than that dealt with at present, is necessary before results closely approximating the truth can be obtained. The only regard in which the findings of Franz, Hellier, Stumpf, and myself, are in surprising agreement, is in the average number of full term pregnancies and abortions per woman. This was 4.77 in Franz's; 4.59 in Hellier's; 4.15 in Stumpf's; and 4.58 in the present series. Since these four series included 3752 women, it would seem that one can assume that the average of these groups, or 4.54 full term pregnancies and abortions per woman, probably approaches the truth very closely indeed. Hellier's group came largely from the laboring classes of Leeds, while the Carnegie series comprises women from widely different stations in life and from widely scattered communities. Those of Franz and Stumpf came from different regions of the European continent. The truly remarkable agreement found in women from three countries seems to imply that the number of births and abortions per woman, is largely if not wholly, independent of nationality, social status, and environment.

A very large proportion of the women in the histories of which the matter was recorded, were childless. This was the case in 143 out of 585 cases, or in 24.4 per cent, but Hellier found the childless to form only 1.3 per cent of his series of 1800 gynecologic cases from

among the working classes of Leeds. Approximately the same percentage of the present series as was childless had but one child. A somewhat smaller number had two children, the childless and those who had one and two children forming 67.1 per cent of the whole group. Yet, one woman had borne 14 and another 16 times.

Franz found that primiparae formed only 4.86 per cent of his series of 844 cases, but if we could assume that all the cases in the Carnegie series which were reported as childless actually were primiparae, then the percentage of the latter in this collection would be 24.7 per cent. However, since such a marked discrepancy exists between the percentage recorded by Franz and the latter figure, it is more than likely that a considerable number of the women recorded as childless in this series, were not primiparae after all. This is indicated also by the fact that only 78 out of 697 women, or 11.2 per cent were unrecorded as to offspring or previous abortions. Only two additional cases were recorded as not having suffered an abortion previously. Consequently only 80 out of these 697 women or 12.9 per cent *apparently* were in their first pregnancy.

Franz found abortion twice as common in multiparae as in nulliparae. From clinical cases Graefe (1896) concluded that women who had borne three times aborted most frequently, but he added that this finding was not confirmed in his private practice. Stumpf found the ratio of abortion to birth one to 5.1 in primiparae but one to 2.21 in multiparae having up to and including five children and one to 2.22 in multiparae having more than five children. In the Carnegie series the average number of abortions per woman was practically the same in the childless and in those having had one child but with the second child, a rise of almost 27 per cent takes place, for the average number of abortions per woman changes from 2.5 to 2.9. Another smaller advance seems to occur with the fourth child although there are but relatively slight fluctuations in women having had four to seven children. Since the number of women having borne eight, nine, and ten children was small, no conclusions could be drawn regarding them.

In all groups except the first two, composed of women having none, or but one child, the average number of abortions lies between 2.9 and 3.6 per woman. Moreover, this ratio is practically the same in the groups having borne two, four, and even six children, but since the total number of cases was only 585, the number in each group necessarily is small, being over 100 in the first three groups only.

Upon comparing the total number of previous abortions suffered by 697 women, with the total number of children borne by them, we find that there was 0.84 previous abortion for every child. However, if the 697 abortions which caused these women to be represented in the Carnegie Collection be included, then the ratio becomes 1.3 instead

of 0.84 abortion per child. However, Malins, on the basis of 2,000 selected private and hospital cases, found but one abortion to every five children. A similar proportion is recorded also by Hellier, who, on the basis of 6974 births and 1288 abortions in 1800 married women, found one abortion for every 5.5 child. Keyssner (1895), on the basis of 9381 births and 1194 abortions, found a ratio of but one abortion to every eight births. Although the statistics of Keyssner were taken from the clinics, polyclinics, and from gynecologic journals, and those of Malins from selected private and hospital cases, one is at a loss to explain the great disparity between them and those in the present series.

In this series of 697 women with 1351 children and 1843 abortions, there were 1.3 abortions for every child or one abortion for every 1.7 pregnancies. This result differs somewhat from that recorded by Taussig, for the cases in the St. Louis Gynecological Clinic, which was one abortion for every 2.3 pregnancies. The lack of a closer correspondence between the estimate made by Taussig and that in the present series, is not surprising for the Carnegie series is fairly representative, being composed to a considerable extent of material obtained from the general practitioner. However it is surprising to find that the ratio of children to abortions is lower in these women than in the cases from a dispensary, unless we accept the doubtful opinion that abortion is, after all, more common among the economically more favored classes.

The relative constancy in the ratio of abortions to children in families with three to seven children, seems to imply that whatever the factors responsible for the interruption of pregnancy, they act with unexpected regularity in women of widely differing ages and with decidedly different reproductive histories. Moreover, this fact would seem to imply that in these women there is no tendency to limit the family to any particular number of children through interference with the gestation, for were such the case, abortion should be most frequent in connection with the particular number of children to which it is attempted to restrict the size of the family through the termination of pregnancy. This could fail to be true only if we could assume that such a limitation of the size of the family is due to causes other than interference with the gestation.

Only 29.1 per cent of the 607 women whose ages were given, were less than 25 years old, but 56.1 per cent were less than 30, and 77.4 per cent less than 35 years. In the series of Stumpf this was true of 23.3, 51.7 and 71.8 per cent of the women, respectively. Upon considering the relation of the different age groups nothing unusual appears. The average number of abortions per child is highest in the 15 to 19 year group, in which it is 4.8. In the 20 to 24 year group it dropped to 1.6 abortions per child and then, as might be expected, a gradual

decrease occurs in each half-decade, from 15 to 50 years, in which it is 0.14.

The number of abortions per woman ranges from 1.1 in the 15 to 19 year group to 2.7 in the 40 to 44 year group. There is a decided drop in this average in the 45 to 49 year group, but since this group contains only three cases, it must be disregarded. In the 15 to 19 and the 20 to 24 year groups, the average number of abortions per woman exceeds the average number of children, but after that the reverse is true, these ratios being almost equal in the 25 to 29 and 30 to 34 year groups. The greatest disproportion between abortions and children is reached in the 40 to 44 year group in which the ratio is 2.08 children for every abortion.

Taussig found 870 full term births in 293 women, the average number of children per woman being 2.9, which is considerably higher, than the average of 1.9 in this series of 697 women. The average number of abortions in 201 women was 1.8, instead of 2.6 as in this series. Hellier (1901), found that 1800 selected married women had borne 6974 children or an average of 3.87 each, and in Franz's series of 4255 women the average number of children per women was still higher, or 4.77.

The series of 446 cases of Stumpf form a striking contrast to the present one, for although the total number of cases of pregnancy in essentially the above age-groups ranges from 89 in the group over 40 to 365 in the 25 to 30 year group, the ratio of abortions per pregnancy differed markedly. Aside from the entire lack of correspondence between the two sets of percentages shown there, especially as far as women below 20 are concerned, in whom the difference is practically 1600 per cent, Stumpf found two maxima of abortions to births instead of a steady decline as in the Carnegie series. Stumpf's first maximum occurred between 26 and 30, and the second after 40. It also is peculiar that although Stumpf's ratios of abortions to births are 200 to 1600 per cent below mine in women below 40 years, they are 200 per cent higher than mine in women beyond these years. Since the discrepancies are so great, it is very likely that a number of unknown factors are involved and it hardly is worth while to try to reconcile them.

The 21 admittedly unmarried women in this series had 25 abortions or 1.2 abortion per woman, and 11 children or 0.5 child each. Both of these figures are below the average for the professedly married women, yet as might be surmised, the ratio of abortions to children is considerably higher in the group of the unmarried, than in all groups of the married except the 15 to 19 group. It is 2.2 abortions per child. It is strange that the average number of abortions per child in the 15 to 19 year group of professedly married women is more than twice as high as in the small group of the unmarried. Were these groups

larger one could conclude that there is something in the marital relationship of women of these years, or in the attitude toward abortion on the part of the married, which is responsible for this difference.

In contrasting the number of abortions per woman in 344 women giving birth to conceptuses classed as normal, with those suffered by 264 women who aborted conceptuses classed as pathologic, we find that the former had sustained an average of 1.7 abortions, and the latter only 1.79, or practically the same number. However, a slight tendency to earlier abortion of pathologic conceptuses is indicated. Yet abortion of conceptuses classed as pathologic strangely enough seems to have had no discernible effect in reducing the average number of children per woman. This, of course, is contrary to what one should expect, and undoubtedly contrary also to the facts. The 256 women giving birth to conceptuses classed as pathologic, really had more children on an average than the 337 who had aborted conceptuses classed as normal, for women giving birth to conceptuses classed as pathologic had an average of 2.3 children, but those aborting conceptuses classed as normal only 2.1 children. Hence, one would seem to be led to the startling and impossible conclusion that pathogenicity of the conceptus, whatever its cause, does not reduce, but enhances fertility! It may be recalled in this connection that Hellier found that 96.5 per cent of the 1800 married women who had abortions "almost up to the maximum", nevertheless later bore one or more children, but the explanation for the above anomalous and self-contradictory result, probably lies in the fact that many conceptuses classed as pathologic, very likely merely are macerated normal specimens, the form of which was changed in the course of long retention.

The women aborting conceptuses classed as pathologic, aborted somewhat earlier, for 86.7 per cent of them aborted before the beginning of the fifth month of gestation, as compared with 76.5 per cent of those who aborted specimens classed as normal. Since the groups contain 402 normal and 290 pathologic cases, this difference in percentages of early abortions might seem to imply that conceptuses classed as pathologic actually had developed under unfavorable conditions, died and were aborted sooner. Since, as previously stated, most of these are young, while those classed as normal are relatively older, one may assume that young conceptuses are retained relatively longer after death than older ones. This conclusion is borne out also upon comparing the menstrual with the estimated or anatomic ages of specimens grouped as normal and pathologic. From such a comparison it is evident that the specimens classed as pathologic were retained relatively longer after death than those classed as normal, and that had they been aborted as soon after their death as were those classed as normal, a larger percentge of them would have been aborted before the fifth menstrual month than actually was the case.

Fifty per cent of the women aborting conceptuses classed as pathologic and 60.9 per cent of those aborting conceptuses classed as normal were below 30 years of age. Hence the women aborting conceptuses classed as pathologic would seem to have been somewhat older.

Upon contrasting the conditions in the small group of negro women included here with that of the white women, one is not justified in drawing any definite conclusion regarding the possibility of racial differences, because the group of negro women is so small, but it nevertheless strikes one's attention that self-induction of abortion is unrecorded among them. Psychic and accidental, mechanical causes also are unrecorded. Therapeutic intervention occurred in only 1.3 per cent of the colored women, but in 6.6 per cent of the white. Families of single children seem to be rarer among these negro women, although according to our last national census the average family among negroes in cities of a population of 10,000 and over, is somewhat smaller than that among whites, with the exception of the cities of Baltimore and Washington. This was true also of this series, for the average number of children was less in the negro women, although they did not differ materially in age grouping.

Abortions among the colored women also seemed to fall somewhat later in the gestation than among the white, only 65.4 per cent of them aborting before the fifth month, as contrasted with 79.7 per cent of the white women. This difference may be due to more prompt interference on the part of white women, rather than to fundamental biologic differences.

Could one take the figures deduced from the records of specimens classed as pathologic at their face value, one would be justified in concluding that but a very small percentage of the abortions here concerned were due to interference on the part of the patient. It also must be remembered that a smaller proportion of abortuses classed as pathologic than of those grouped as normal, probably are interfered with by the patient. This follows from the supposition that a normal gestation may be presumed to continue uninterrupted far more frequently than a pathologic one, a statement made also by Giacomini and Mall.

Abortion was recorded as self-induced in approximately 34 per cent of 198 histories selected from the Carnegie Collection, in which other causes than diseases are mentioned. But these percentages do not truly represent the situation, for such interference no doubt occurred in a far larger percentage of cases, because physicians are disinclined to record and report, and patients still more disinclined to state such a fact. Moreover, that the alleged causes not always are the true ones, is a matter of common knowledge.

The interference was alleged to have been medicinal in only two of these cases. In the rest it was said to have been mechanical. This

was true of 68 out of 90 cases in which the termination of the gestation was alleged to have been due to medicinal, accidental, or psychic causes or to mechanical interference on the part of the patient. This is a percentage of 70.8. Associated diseases were mentioned in only 54 out of 252 cases or in 21.4 per cent. The abortion was recorded as having been spontaneous in two cases only, although no cause was recorded in 463 of the 697 cases. Therapeutic abortions formed 24.7 per cent of those in which a cause was assigned.

A comparison of the part played by various alleged causes of abortion as recorded in histories classed as normal and pathologic shows that tumors and displacements of the uterus are recorded more frequently as a cause of abortion among specimens classed as normal and self-induction more frequently among those classed as pathologic. A higher percentage of the latter were associated with diseases, and miscellaneous and psychic causes of abortion also were recorded more frequently among them. Interference might be presumed to occur more frequently in cases involving pathologic conditions, yet it is recorded more frequently in connection with conceptuses classed as normal. It is not unlikely that the explanation given for the apparent increase of fertility with abortion applies also to this contradictory result. However, therapeutic intervention was somewhat more common among the pathologic, in a somewhat larger percentage of which no cause for the termination of pregnancy was assigned. The latter was the case in 76.6 per cent of 264 pathologic and in 63.3 per cent of 344 normal cases out of a total of 608. Miscellaneous causes, such as exertion, purgative drugs, coitus, etc., were assigned as frequently in the one as in the other class of cases, but the total number in each group is so small that these percentages probably are not very reliable.

That the abortion was inevitable in many, even if not in the majority of the so-called spontaneous or habitual cases, is corroborated by the fact that most of the abortuses in the pathologic division are young, by far the greater majority of the older fetuses falling among the normal. Moreover, many of the larger conceptuses also were received fresh and, in the case of those which were received in consequence of such complications of pregnancy as toxemia, pernicious vomiting, placenta previa, febrile conditions and other pathologic conditions, these facts are recorded.

There often is no way of accounting for the termination of the so-called spontaneous cases from an examination of the conceptuses alone. However, it was very interesting to find frequently that the chorionic vesicle and also the decidua of these abortuses had undergone pronounced changes in abortions which were reported as spontaneous. Many of these fell into the first four groups of Mall's classification and showed the presence of hydatiform degeneration, thus contradicting the statement of Hegar (1904) that hydatiform moles

almost invariably occur only later in pregnancy and confirming Solowij (1899) who claimed that clinical experience teaches that hydatiform moles are aborted *in toto* only in the first months of pregnancy.

Indeed, pathologic conditions of the chorion and decidua seem to be especially frequent causes for the termination of pregnancy during the early months, although one must recall that decidual and possibly chorionic changes may be the consequence of previous interference alone. It long may remain impossible to determine the true or original cause of antenatal death, for the secondary or immediate cause may completely mislead one. Hegar (1902) concluded that the cause of abortion not infrequently lies in the decidua alone and that the death of the cyema usually can be shown to be due to degenerate changes in the villi. He came to this conclusion because he found no evidence of pathologic changes in the chorions of some abortuses. That endometritis and other uterine conditions pre-existent to implantation may be responsible, especially for early abortions, one cannot doubt, for the changes in the endometrium and decidua frequently seem to be so profound.

Certain minor alleged causes of abortion to which recourse is had by patients recur so frequently in the histories, that this fact alone suggests that they probably are not the true or ultimate causes. Among such, a slip or a slight fall usually on the stairs, and minor psychic disturbances may be cited. That psychic disturbances may interrupt gestation seems quite likely, but they probably merely are the immediate, not the ultimate cause of the abortion. They could be regarded as the ultimate cause only if the conceptus is aborted well preserved, for otherwise one would have to assume that psychic causes can produce sufficiently severe uterine contractions to cause the death of the conceptus, and that later, after the conceptus had become macerated, recurring or similar psychic disturbances finally effected the expulsion of the macerated specimen.

Since infectious diseases, no doubt, very often are the immediate rather than the ultimate cause of abortion, as Harris (1919) found in the case of influenza, it undoubtedly may be assumed that many of the abortions caused by such and similar complications of pregnancy were inevitable. They remind one of the defective fruit which persists insecurely upon the tree until a sudden gust of wind showers it to the ground. The findings of Harris regarding the effects of influenza and pneumonia upon gestation, seem to be confirmed also by the small number of cases of abortion in this series in which the abortion was attributed to an infectious disease. But in considering the alleged causes of abortion, one must bear in mind that when a woman knows of a plausible, extenuating reason for the termination of the gestation, she has every incentive to state it. That this is the case is indicated by the various strange, and, to the initiated, highly improb-

able or even impossible reasons often assigned for the interruption of a pregnancy.

Associated constitutional or venereal diseases were recorded in only 76 out of 697 selected histories. In 463 of these 697 cases, the cause of abortion was not given. In 52 out of the 72 cases in which associated diseases were present, other causes for the termination of pregnancy also were recorded. Hence the suggestion that the associated diseases probably were merely the immediate or incidental causes in these cases, seems decidedly probable.

What strikes one's attention in the perusal of some of the histories, is the long period during which many of these young conceptuses really were in process of abortion as indicated not only by the anatomic as contrasted with the menstrual age, but also by the repeated hemorrhages. Since in most of these cases the abortion probably was inevitable from the beginning, it would seem that the conclusion of Giacomini, reached also by Mall, that one should not temporize with such cases but promptly relieve the patient of an abnormal, dead or dying conceptus, would seem to be justified. That some general practitioners apparently are beginning to realize this situation is illustrated by the comment of Dr. Bacon, who, in connection with a recent specimen donated to the Collection, wrote: "This makes the second or third case in which I have apparently delayed an abortion, and when the gestation finally was ended, was rewarded with an abnormal child for my pains. I wonder if it really pays humanity?" However, the practitioner no doubt meets with great and often insuperable difficulties in determining the exact status of affairs, and in the present state of our knowledge, he must temporize so as not to be led into unjustifiable procedures. There is no doubt, however, that conservative symptomatic treatment, no matter how unavoidable in consequence of our inability to determine the condition of the conceptus, often is directly opposed to the best interests of the patient.

No case confirmatory of that reported by Jackson (1838) came to my attention among those in the Carnegie Collection. It seems strange that one of a pair of human twins can be aborted weeks or even months before term and that the other can continue in uninterrupted development to the end of normal gestation. Moreover, since the authenticity of Jackson's case rests solely upon the statement of "a very intelligent lady" who was "too intelligent to be deceived and too honest to deceive", one scarcely can feel convinced by it alone. However, Jackson stated that Nanerede observed a similar case in which one fetus was aborted at 4½ months and the other went to term, and Fuertes (1879), reported such an instance as one of superfetation. In this case a woman of 27 years gave birth to a male on March 13th, and to a female on July 27th. The former, which lived only 15 days, was regarded as having been born in the seventh month of pregnancy, and the latter

at full term. Bonnar (1865) also reported a series of cases of this sort in connection with a critical review of the question of superfetation. It is true that the alleged denouement in dystocia and also in cases of interrupted labor seems to suggest that even vigorous contractions of the uterus are not inconsistent with retention of attachment by the placenta, but expulsion of one with retention of the other fetus some months afterward, would seem to fall into a somewhat different category.

In examining the present histories one is impressed by the frequent cases of socalled "habitual abortion." These sometimes begin with the married life of a young woman and continue more or less interruptedly throughout her childbearing period. This is illustrated by the cases in which a birth at term was followed by several abortions, and by another birth at term and again by several abortions. Regarding some of these cases it clearly is stated that the patients took steps to terminate the unwelcome pregnancies, and in others the histories concerned mothers who had given birth to six or more, even up to thirteen children, and then had suffered one or more successive abortions, without any history of previous abortions. This is illustrated by the following seven cases, for example, in which the women had borne 6, 8, 9, 10, 11, 12 and 12 children, respectively. The first woman had experienced four successive abortions, the following five one abortion each, and the last, three successive abortions. In some of these cases it is fairly evident that weariness with heavy burdens of childbearing probably was responsible for the termination of the pregnancy, while in others abortion may have resulted from exhaustion due to a large series of quickly succeeding gestations, and in still others to pathologic or other causes. Experience with the higher domestic animals also would seem to suggest that abortion not infrequently follows too closely repeated pregnancies, especially under the stress of advancing years.

REFERENCES

Ahfeld, F.: Lehrbuch der Geburtshilfe, Zwte. Aufl., 1898. Bonnar, George Lindsay: A Critical Inquiry Regarding Superfetation with Cases, Edinburgh Med. Jour., 1865, x, Pt. III. Busch and Moser: Handbuch der Geburtskunde, Abortus. Berlin (Quoted from Lechler). 1840. Chazan, S.: Die Fehlgeburt, ihr Vorkommen, Verlauf und ihre Behandlung, Handbuch der Geburtshilfe von Winckel, ii, 1904, Wiesbaden. Dührssen: Zur Pathologie und Therapie des Abortus. Arch. f. Gynäk., xxxi, 1887. Franz, K.: Zur Lehre des Aborts, Beitr. z. Geburtsh. u. Gynäk., i, 1898. Fuertes, Ricardo: Superfetacion, Tesis inaugural de Escuela Medicina de Mejico., 1879. Graefe, Max: Ueber Retention des menschlichen Eies im Uterus nach dem Fruchttode, Festschrft. f. Carl Ruge. 1896. Harris, John W.: Influenza Occurring in Pregnant Women. A Statistical Study of 1350 Cases, Jour. Am. Med. Assn., 1919, lxxii. Hegar, A.: Beiträge zur Lehre vom Abort, Beitr. z. Geburtsh. u. Gynäk., 1902, vi. Hegar, Karl: Der Abort, Die deutsche Klinik am Eingange des zwanzigsten Jahrhundertes, ix, 1904. Hegar, A.: Beiträge zur Pathologie des Eies und zum Abort. in den ersten Schwangerschaftswochen, Monatschr. f. Gebk., 1863, xxi, Sup. Hft. Hellier, J. B.: A Note on the Occurrence of Abortion, Brit. Med. Jour., 1901. Jackson, Samuel: Abortion of One Twin, the Other Remaining, Am. Jour. Med. Sc., May, 1838. Keyssner, E.: Ueber die relative

Häufigkeit der vorzeitigen Unterbrechung der Schwangerschaft, Centralbl. f. Gynäk., 1895, p. 1348. Lechler, E.: Pathologie und Therapie des Abortus, Inaug. Dissert., Berlin, 1883. Malins, Edward: Some Aspects of the Economic and of the Antenatal Waste of Life in Nature and Civilization, Jour. Obst. and Gynec. Brit. Emp., 1903, iii. Mall, F. P.: On the Frequency of Localized Anomalies in Human Embryos and Infants at Birth, Am. Jour. Anat., 1917, xxii, ibid.: Note on Abortions with Letters from the Health Commissioner of Baltimore and from the Chief of the Bureau of Vital Statistics of Maryland Regarding Registration and Shipment of Embryos to the Carnegie Laboratory of Embryology at the Johns Hopkins Medical School, Circular No. 20, January 20, 1917. Michailoff: Durchschnittsziffern der Geburtshülfe in Russland in 50 Jahren, Jour. f. Geburtsh., 1897, p. 859, (Russian). Pearson, Carl: The Chances of Death, London, 1906. Robinson, Wm. J.: Abortion, Historically and Ethnologically Considered, Am. Jour. of Urology and Sexology, 1919, xv. Schultz, Adolph: Chapter vii in Studies on Abortuses: A Survey of and Studies upon Pathological Ova in the Carnegie Embryological Collection, Mall-Meyer, Carnegie Institution, Washington, D. C., 1921. Solowij, A.: Uber Bösartigkeit der Blasenmole, Verhandl. d. deutsch. Gesellsch. f. Gynäk., Achte Versammlung, 1899. Stumpf, Max: Zur Ätiologie und Behandlung der Fehl- und Frühgeburten, München, med. Wchnschr., 1892, xl. Taussig, F. J.: Prevention and Treatment of Abortion, St. Louis, 1910. Williams, J. Whitridge: Text-book of Obstetrics, New York and London, 1916.

121 Waverly Street.

SPONTANEOUS EVOLUTION FOLLOWING TRANSVERSE PRESENTATION OF THE FETUS

With Report of a Case

By Matthew Marshall, B.S., M.D., Pittsburgh, Pa.*

From the Department of Obstetrics, (Service of Dr. Paul Titus), Western Pennsylvania Hospital, Pittsburgh.

TRANSVERSE presentation of the fetus is a formidable complication, especially if the patient has been allowed to advance in her labor to the point where the arm has prolapsed and the shoulder has become impacted into the pelvis. In practically all such cases it will be found that the fetus is dead and unless proper treatment is instituted promptly there is grave danger of rupture of the thinned-out lower uterine segment of the uterus.

Decapitation of the dead fetus is, quite naturally, the first procedure considered when one is confronted by such a situation and as a general thing some such operation must be undertaken at once. Occasionally, however, spontaneous evolution may occur, and is of interest, not because it offers an outlook for delivery in a neglected case, but because of its extreme rarity.

Spontaneous evolution is a mechanism of delivery by which the body of the transversely presenting fetus is bent upon itself, being forced gradually down into the pelvis. The head impinges above the ileopectineal line on one side, and the neck becomes excessively stretched, thus allowing the shoulder, arm and thorax to be packed

*Posthumous publication, Dr. Marshall's death having occurred on January 24, 1921.

down into the birth canal. Prolapse of the arm gains room for the trunk and eventually the groin, the buttocks appear next at the vulva alongside the arm, whereupon evolution is complete and delivery may be effected with comparative ease.

Spontaneous evolution is not to be confused with spontaneous version. This latter is simply the spontaneous conversion of a transverse presentation into a longitudinal one by virtue of the fact that the fetus is more or less freely movable in the fluid contained within an

Fig. 1.—First step in Douglas' mechanism of spontaneous evolution: impaction of shoulder with prolapse of arm.

intact amniotic sac. This may be brought about by the occurrence of labor pains or even by changes in posture, and is mentioned merely to emphasize the distinction between the comparatively common thing on the one hand and the rare condition on the other.

HISTORICAL REVIEW OF CASES AND MECHANISMS DESCRIBED

Considerable confusion seems to exist in the minds of those who have been interested in these conditions, because of the distinction between

the three conditions, (1) spontaneous version, (2) partus con duplicato corpore, in which the head and thorax pass through the birth canal simultaneously, the head having been sharply flexed upon and pressed into the thorax, and (3) spontaneous evolution as described above.

Hippocrates recognized transverse presentations, and according to his ideas the prolapse of an arm was an indication of fetal death. Payer[1] says that Hippocrates considered the possibility of spontaneous evolution.

Fig. 2.—Second step in Douglas' mechanism of spontaneous evolution: stretching of neck, advance of trunk through pelvis, birth of shoulder.

Denman[2] in 1772 reported three cases of what he designated spontaneous evolution, and later claimed to have seen a total of thirty such cases, the baby being born alive in one instance. Payer[1] interpreted Denman's report as specifying a mechanism in which the prolapsed arm receded, after which the breech descended. Denman's description of his observations is too vague and inaccurate to warrant its designation as an exact mechanism.

In 1819, Douglas[3] described two types of mechanism by which

a transversely presenting fetus might be born spontaneously. He referred to them as spontaneous evolution and spontaneous expulsion. What he means by the latter term is not quite clear, but his description of the mechanism of spontaneous evolution is classic, with the result that this mode of delivery has come to be called "spontaneous evolution by Douglas' mechanism."

Fig. 3.—Third step in Douglas' mechanism of spontaneous evolution: birth of thorax and buttocks.

Stephenson[4] has described two cases of spontaneous evolution occurring in the Obstetric Service of the Johns Hopkins Hospital, and he is of the belief that this mode of delivery can take place only by Douglas' mechanism. The single case which I have to describe also followed the steps outlined by Douglas.

Description of Douglas' Mechanism.—Williams[5] in his textbook gives a brief but comprehensive description of this mechanism, and I feel that it may properly be quoted verbatim.

"In Douglas' mechanism, the first stage consists in the molding of the fetus and impaction of the shoulder with prolapse of the arm. Then, under the influence of strong uterine contractions, the child rotates about its vertical axis, so that one side of the head comes to lie over the horizontal ramus of the pubis with the breech in the region of the opposite sacro-iliac joint, while the neck subtends the inner surface of the symphysis pubis. Coincident with excessive stretching of the neck, the prolapsed arm continues to descend until eventually the corresponding shoulder emerges under the pubic arch. The escape of the arm and shoulder affords room for the entrance of the rest of the body of the child into the pelvic cavity, and the lower side of the thorax, promptly followed by the breech, soon emerges from the vulva. Following the breech the anterior side of the thorax and the remaining arm are delivered, while the head is born spontaneously, or is extracted manually, according to the exigencies of the case. In such cases the prolapsed arm is immensely swollen and a caput succedaneum develops over the presenting shoulder."

INCIDENCE OF SPONTANEOUS EVOLUTION

Transverse presentation occurs approximately once in two hundred pregnancies at or near term (Schroeder[6]). The rarity of spontaneous evolution will be appreciated, therefore, when it is pointed out that it occurs once in several hundred transverse presentations. Payer[1] collected records of 34 cases in 468,557 births, whereas Stephenson reports it as having occurred at Johns Hopkins Hospital twice in 13,000 deliveries. It has been observed at the Western Pennsylvania Hospital just once in a total of about 3,500 deliveries at or near full term.

CASE REPORT.—The patient, Mrs. S. B., a negress, aged twenty-nine years, pregnant for the eighth time. Her estimated date of confinement was August 22, 1920, but she passed this date, falling into labor two days later. It is of interest, since this was a twin pregnancy, that there is a family history of multiple pregnancies. Her husband has a brother and a sister who are twins, and the patient has two maternal aunts living, who are twins. The patient's other pregnancies and labors had been normal in every respect.

According to the attending physician, the delivery of the first twin was spontaneous after about four hours of labor, taking place at 12:05 P.M. on August 24, 1920. The membranes of the second twin ruptured about 3 P.M. and the right arm prolapsed through the vulva as the amniotic fluid drained away. The patient was being cared for under the most unsanitary and unhygienic circumstances and apparently there was little or no attempt at asepsis during the course of her treatment at home.

At 6 P.M. of the same day, the ambulance was called to take the patient to the Western Pennsylvania Hospital. Examination of the patient showed that the baby's entire right arm and shoulder were prolapsed through the vagina and vulva. The dorsal part of the right chest was also presenting, being visible as far as the inferior angle of the scapula. The baby was lying in a left acromion anterior position of a transverse presentation, and there was marked caput formation with its characteristic discoloration over the presenting part.

The ride to the Hospital was rather rough and the patient complained considerably during the trip of pains from which she was suffering. When placed upon the table in the Admission Room a distinct change was apparent from the findings as noted at the patient's house. The right arm and shoulder were prolapsed as described above, but in addition to this the right side of the baby's trunk down to and including the right buttock was visible at the vulva. The body of the child was in a state of

marked lateral flexion so that some of the left side of its back could be seen. The right shoulder was tightly impinged under the symphysis pubis, and the shoulder and arm were a deep purple hue. No heart sounds could be heard through the baby's thorax.

Sterile gloves were drawn on, and the mere insertion of the fingers into the baby's right groin, with slight traction was sufficient to cause advance of the right buttock, followed immediately by the left buttock and then by both feet. The evolution

Fig. 4.—Fourth step in Douglas' mechanism of spontaneous evolution: evolution complete, birth proceeding as in breech presentation.

was spontaneous except for this slight interference or assistance. Delivery of the head was easily effected by Mauriceau's maneuver, and it was noted at the time that the neck had been stretched to a considerable length. The infant was stillborn and weighed 2640 grams.

The mother's pelvic measurements were taken, and were those of a generally contracted pelvis of the rhachitic type. They were as follows: *Inlet;* interspinous 20.5

cm., intercristate 23 cm., bitrochanteric 28.5 cm., external conjugate 17.5 cm., diagonal conjugate 11- cm., true conjugate 8.5 cm., *Outlet;* anteroposterior 9.5 cm., transverse 10 cm., anterior sagittal 6 cm., posterior sagittal 9 cm.

A papier maché model pelvis, the measurements of which corresponded fairly closely to those of the patient was taken and the dead infant passed through it in duplication of the steps which had been observed. Several interesting photographs of the different steps in the mechanism were taken by Dr. J. F. McCullough.

It is of interest that Herrgott[7] has recently reported a case of spontaneous evolution with a history closely resembling that of this case. It occurred in the second baby of a twin pregnancy, and the delivery was completed immediately after a long, rough ride to the hospital.

To summarize this subject as presented here, it may be said that spontaneous evolution is so rare that it cannot be relied upon to solve the problem of a fetus presenting transversely and impacted. The only accurately described mechanism of this delivery is that of Douglas, which was the type observed in this case. The occurrence of evolution seems to be largely dependent upon several factors, such as maceration of the fetus, unless it be small by virtue of being one of twins, or premature. It is also essential that the neck stretch sufficiently so that the head can be above the ileopectineal line and the laterally flexed body within the birth canal.

BIBLIOGRAPHY

(1) Payer: Zur Lehre von der Selbstentwickelung, Volkmann's Sammlung klin. Vorträge, 1901, No. 314. (2) Denman: Observations to Prove that Delivery May be Effected by Spontaneous Evolution of the Child, London Med. Jour., 1785, v, 64. (3) Douglas: An Explanation of the Real Process of Spontaneous Evolution of the Fetus, ed. 2, Dublin, 1819. (4) Stephenson: The Mechanism of Labor in Spontaneous Evolution, Bull. Johns Hopkins Hosp., 1915, xxvi, 331. (5) Williams: Obstetrics, 1919, ed. 4, 869. (6) Schroeder, Olshausen und Veit: Lehrbuch der Geburtshülfe, 1899, ed. 13. (7) Herrgott: Un cas d'Evolution Spontani, Ann. de gynec. et d'obst., 1908, xiii, 193.

THE SIGNIFICANCE OF THE PELVIC OUTLET IN PERINEAL LACERATIONS, CYSTOCELE, AND PROLAPSE*

By Arthur Morse, M.D., New Haven, Conn.

From the Department of Obstetrics and Gynecology, Yale University School of Medicine.

ALTHOUGH it is universally recognized that the conformation of the pelvis influences the course of labor, there is little in obstetric literature regarding the relations of the pelvic dimensions to the production of perineal lacerations, cystocele and prolapse. Indeed, when the nonpregnant woman enters the hospital for the treatment of injuries involving the pelvic floor, mensuration of the pelvis is commonly neglected.

In the Woman's Clinic at Yale we have practiced external and internal pelvimetry of the inlet and outlet of the pelvis not only in our obstetrical but in all gynecologic cases. The routine examination of cases presenting themselves gave me the impression that while a varying degree of perineal relaxation is generally encountered with injuries of the pelvic diaphragm, the most notable degrees of cystocele and prolapse are associated with a bony outlet which presents no abnormalities. This observation stimulated me to a study of the pelvic outlet in a group of women presenting these lesions in order to disprove or verify my original impression and to determine whether the type of pubic arch plays a part in the type of injury which occurs. And, also, I have considered the question, in childbearing women, of a secondary perineal repair as viewed from the angle of outlet pelvimetry.

It is generally agreed at the present time that the uterus and bladder are held in position by the fascia and ligaments of the anterior segment of the pelvis supplemented by the muscles of the pelvic floor. There is not, however, a unanimity of opinion regarding the effect upon these organs of injuries to the different supporting structures. Prolapse and cystocele are frequently seen accompanying a third degree tear of the perineum and for this reason many have concluded that the laceration has a causal relation to them. But, obviously, it is illogical to conclude that deep lacerations of the perineum are always of noteworthy significance in connection with the abnormalities in question, since descent of the bladder and uterus can exist for many years unassociated with such an injury to the perineal body.

Indeed, the experience of various investigators accords entirely with this conclusion. Thus Gännsle in a clinical study of 138 women

*Read at a meeting of the New York Obstetrics Society, February 8, 1921.

with a complete perineal laceration found prolapse of the uterus in only 48.2 per cent. Moreover, Treub diagnosed a cystocele in but three of fifty-five cases in which a perineal laceration extended into the rectum; while in 146 cases of prolapse seen by the same author a complete tear of the perineum was present but once. Similarly, Schaback, upon analyzing a series of fifty cases of perineal laceration found a slight prolapse in but nine instances, and Nebesky reports that of 34 cases of complete perineal laceration only nine were complicated by descent of the uterus.

Such observations indicate that the anterior and posterior segments of the pelvic floor do not suffer equally during delivery; for although a third degree tear may occur, the structures supporting the bladder and uterus may escape injury. Conversely, descent of the bladder and uterus is seen associated with a perineum which is practically intact. It appears, therefore, that while a deep perineal laceration with separation of the levator ani muscles may allow an increase in the degree of cystocele or of prolapse, it is not an important factor in their production.

Under these circumstances, the underlying cause of cystocele and prolapse has been sought in an injury to the paravesical and paracervical tissues and various theories have been offered to account for the damage which occurs. Some authorities attribute the stretching and occasional atrophy of these structures to an undue prolongation of labor or to disproportion between the pelvis and fetal head; others regard the too early application of forceps, or the injudicious use of pituitrin as of etiologic importance. All these factors probably play a part in the causation of cystocele and descent of the uterus, but it seemed probable that a study of the pelvic outlet in relation to these lesions might throw additional light upon the mechanism of their production. It is the purpose of this paper to present the results of such a study.

With this point in mind I have reviewed the records of 100 patients who entered the Clinic for operative relief of perineal laceration, cystocele, or prolapse. Measured by the usual methods, the diameters of the pelvic inlet demonstrated in each case a superior strait of normal dimensions. In other words, no one of these pelves showed abnormalities due to a general contraction or to rickets. On the other hand, while the anteroposterior diameters of the pelvic outlet showed no remarkable deviation from normal, in certain cases the bituberal diameter was shortened. Usually, of course, it was well above 8 cm. and the pelvis was diagnosed as normal; in a smaller number it was 8 cm. or somewhat below and consequently the pelvis was classified as a typical funnel.

Upon this basis the 100 cases in the series in question fall into two groups; 79 in which the bituberal diameter of the outlet was normal

and 21 in which the diameter was shortened to 8 cm. or less. In 60 of the 79 cases with a normal outlet, the outstanding lesion was a cystocele or prolapse; while in 19 the perineal laceration was unassociated with these conditions. On the other hand, of the 21 women in whom a funnel pelvis was diagnosed, but 7 showed injuries to the anterior half of the supporting structures and these were extensive in only three. In the remaining fourteen a plastic operation was necessary only upon the perineum. In other words, of the 79 cases with a normal pubic arch 76 per cent were suffering from cystocele or prolapse, while 24 per cent showed lesions of the perineum only: Of the 29 cases with a funnel pelvis, on the other hand, only 33 per cent were associated with cystocele or prolapse as contrasted with 67 per cent in whom these lesions were lacking.

Even in the absence of data regarding the duration of the previous labors, the weight of the child and the consistency and size of the fetal head, the information derived from an analysis of the facts in our possession is instructive. In the first place, the significance of a forceps operation in the production of injuries to the structures of the anterior portion of the pelvic diaphragm is emphasized. Thus of the 19 women in whom the outlet was normal and unassociated with cystocele or prolapse, but 4, or 21 per cent, had been delivered by forceps. On the other hand, of the 60 patients with a similar outlet but presenting these lesions, 24, or 40 per cent, gave a history of one or more labors which were terminated instrumentally. The latter coincidence is explained, I believe, by the fact that in an effort to save the perineum the head is too greatly extended by the forceps. As indicated by Döderlein and Pankow, this procedure leads occasionally to a partial separation of the puborectalis from its attachment near the symphysis. Moreover, there must result an unusual stretching of the ligaments and fascia owing to the crushing of these structures between the occiput and symphysis. Again, although cystocele and prolapse were found most commonly in multiparous women, there were five primiparæ presenting these lesions of whom three had been delivered spontaneously. Finally, it is worthy of note that cystocele and prolapse were encountered most frequently in women with a normal bony outlet; or, in other words, associated with an inferior strait of such dimensions that there could be no disproportion between a normal-sized, well-flexed fetal head and the pubic arch.

It appears, therefore, that while prolonged labor, disproportion between the pelvis and the presenting part, a too rapid dilatation of the cervix or the injudicious use of pituitrin, may play a part in the production of cystocele and prolapse, the adaptation of the head to the pubic arch also is of significance. As the head escapes through a normal outlet, it fills out the space included within the pubic arch so that when the occiput engages beneath the symphysis, the suboccipito-

frontal diameter practically coincides with the anteroposterior diameter of the pelvic outlet or more accurately with the plane of least pelvic dimensions. Under these circumstances, as the presenting part descends, the anterior portion of the pelvic floor becomes forced against the inferior and posterior portion of the symphysis. In this event, damage to the paracervical and paravesical tissues occurs, predisposing to cystocele and prolapse. As I have shown, this takes place in spontaneous delivery and particularly when labor is terminated by forceps.

Perineal lacerations, of course, are most commonly attributed to abnormalities in the mechanism of labor. The most frequent of these is imperfect extension of the head so that the vulva is distended by the occipitofrontal instead of the suboccipitobregmatic or suboccipitofrontal circumference. In some cases, however, the presenting part may be directed too far backward, and since extension does not occur, the uterine contractions force the presenting part directly downward upon the perineal body instead of guiding it upward and forward toward the vulval opening.

In other instances perineal tears depend upon the method of expulsion of the head through the outlet of a funnel pelvis and this is perhaps the most important cause of complete perineal laceration. In such a pelvis, the bituberal diameter of the outlet is shortened and the pubic arch is lengthened and narrowed. The suboccipital region, therefore, can no longer engage directly beneath the symphysis, but as the contraction becomes more marked will impinge lower down upon the ischiopubic rami, so that in extreme cases the head can be extruded only posterior to a line joining the tubera ischii. Under these circumstances, owing to the extreme distention of the perineum, deep lacerations occur. At the same time, it appears that as a result of the backward displacement of the presenting part and the tearing of the perineum, the strain upon the structures of the anterior portion of the pelvic diaphragm is relieved, and thus they escape such serious injury as predisposes to cystocele and prolapse.

The importance of mensuration of the pelvic outlet in the prenatal study of obstetrical cases is generally recognized, but in conclusion I wish to point out that it is of practical significance also in the preoperative examination of patients presenting lesions of the pelvic floor. The inadvisability of extensive plastic procedures in the event of subsequent labors and the importance of the type of operation chosen for the repair of lacerations of the pelvic floor has been emphasized by Frank. Similarly, in women still within the childbearing period, the choice of operation for a perineal laceration should depend upon the character of the pelvic outlet. If the bituberal diameter is above 8 cm., the narrowing of the vagina with a high reconstruction of the perineum is less likely to prove disadvantageous in the event of future

delivery, for while a reproduction of the previous laceration is possible, it may, with proper care, be avoided. If the bituberal diameter is below 8 cm., however, a deep perineal tear will almost certainly recur in a subsequent labor. In pelves of this type the occiput cannot fit up under the pubic arch and in order to be delivered the head must be displaced backward toward the coccyx. Obviously, it follows that given a normal sized fetal head the extent of the newly produced laceration will be as great as that which formerly existed. Accordingly, if the bituberal diameter measures 8 cm. or less a conservative plastic procedure should be adopted. From the standpoint of operative treatment, then, outlet pelvimetry is of value for it gives information regarding the character of the inferior strait and thus indicates the type of perineal repair which is adapted to the individual woman still in the childbearing period.

To recapitulate:

1. In 100 women presenting perineal laceration, cystocele, or prolapse, mensuration of the pelvis demonstrated a bony outlet of normal dimensions in 79 and a typical funnel pelvis in 21.

2. Of the 79 cases with a normal outlet, 60, or 76 per cent showed a cystocele or prolapse as the outstanding lesion, while in 19, or 24 per cent, a perineal laceration was unassociated with these conditions.

3. Of the 21 women in whom a funnel pelvis was diagnosed, lesions of the structures in the anterior half of the pelvic diaphragm were present in but 7, or 33 per cent. In 14, or 67 per cent a plastic operation was necessary upon the perineum only.

4. The significance of the forceps operation in the production of injuries to the supporting structures in the anterior portion of the pelvic floor is emphasized. Of 19 women in whom the outlet was normal and unassociated with cystocele or prolapse, but, 4 or 21 per cent had been delivered by this procedure. On the other hand, of the 60 women with the same type of outlet, but presenting these lesions 24, or 40 per cent, gave a history of one or more labors terminated instrumentally.

5. Although cystocele and prolapse are usually encountered in multiparous women these lesions may follow a single spontaneous delivery.

6. In the series of cases in question, cystocele or prolapse was most frequently found in women possessing an inferior strait of such dimensions that there could be no disproportion between a normal-sized, well-flexed head and the pubic arch. This association is attributable to the fact that as the occiput passes closely beneath the symphysis damage to the supporting structures occurs, predisposing to descent of the bladder and uterus.

7. In certain cases deep perineal tears depend upon the mechanism of expulsion of the head through the outlet of a funnel pelvis. However, it appears that coincident with the backward displacement of the

presenting part and the tearing of the perineum, the structures of the anterior half of the pelvic diaphragm in many cases escape injury.

8. Mensuration of the pelvic outlet should be employed in the preoperative examination of women still in the childbearing period who present themselves for a secondary repair of the perineum and the type of plastic procedure should be adapted to the type of outlet in the particular case.

REFERENCES

Döderlein: Döderlein-Krönig Operative Gynäkologie, Leipzig, 1912. Frank: Surg., Gynec. and Obst., 1917, xxiv, 42-60. Gännsle: Monatschr. f. Geburtsh, u. Gynäk., 1919, xlix, 243-259. Nebesky: Arch. f. Gynäk., 1909, lxxxvii, 497-571. Pankow: Quoted from Schultz. Monatschr. f. Geburtsh. u. Gynäk., 1913, xxxviii, 681-726. Schabaek: Quoted from Schultz. Treub: Quoted from Schultz.

(*For discussion, see p.* 197.)

POSTOPERATIVE TETANY DUE TO SODIUM BICARBONATE*

By William P. Healy, M.D., New York City

CORVISART, in 1852, introduced the name tetany after studying cases occurring in epidemic form in Paris. Tetany is characterized by tonic, intermittent contraction or spasms of the muscles of the extremities—usually symmetrical in distribution, and most frequently affecting the muscles of the upper extremities—resulting in a characteristic position of the hands, the so-called obstetrical hands. The thumb is turned into the palm, and the proximal phalanges flexed, and the middle and terminal phalanges are extended. There may also be slight flexion at the wrist. The cramp-like contractions are often painful. Consciousness, as a rule, is retained.

Tetany, at the present time, is regarded as a symptom complex, occurring under many different conditions, and therefore is referred to under many qualifying names, usually indicative of the supposed etiology in the given case, such as tetany idiopathica, seen chiefly in young adults, tetany epidemica, or rheumatica, occurring in Europe, tetany gravida, tetany gastroenterica, tetany toxica (chemical and bacterial) tetany parathyroidea, etc.

Tetany, therefore, should not be regarded as a disease conception but as a "more or less localized manifestation of a convulsive nature—due to a large number of exciting causes—possibly with some single and unique underlying factor." (Modern Medicine, Vol. V.)

Tetany is not a common clinical manifestation, and is rarely seen in adults. The epidemic form has never been reported in the United States.

---

*Read at a meeting of the Section on Obstetrics and Gynecology, New York Academy of Medicine, March 22, 1921.

Some research workers have shown "an intimate relation between the various forms of tetany and an insufficiency of the parathyroid glands." (Kinnicutt).

MacCallum and Voegtlin have suggested a direct relationship between disturbances of the calcium content of the tissues of the body and tetany, and have shown the moderating effect of the calcium salts upon the hyperexcitability of the central nervous system and that calcium salts have a controlling influence upon the spasm of experimental tetany. "The identity of experimental tetany in animals with human tetany, and the recognition that all the various forms of tetany clinically described have a common basis in parathyroid insufficiency, followed from a long series of experimental and clinical observations." (Monographic Medicine, Vol. 4, Barker.)

These researches tend to show that "the secretions of the parathyroid bodies exert in an as yet imperfectly understood way a controlling influence upon calcium metabolism." (Kinnicutt.)

The results observed by MacCullum and Voegtlin have suggested the probable value of the calcium salts in the treatment of the various forms of human tetany.

The cases I wish to report to you are instances of postoperative tetany in adults. These cases have developed symptoms of tetany in its varied manifestations after celiotomy for operations on the pelvic viscera. There were seven cases.

Onset of the typical hand symptoms was observed as early as seven hours after operation in Case 5, and the symptoms terminated within forty-eight hours after operation in each case—either in response to treatment, or by the death of the patient. There were four deaths and three recoveries.

The patients received nitrous oxide and ether anesthesia administered by a specialist and the operations were done by four different surgeons.

The last three cases recovered after the administration of calcium lactate by mouth. In Case 5, the symptoms had been present twenty hours before the calcium lactate, with lime water, was given.

The records of these cases are briefly as follows:

Case 1.—S. C., Aet. 30, Married, Weight 95 lbs., Complaint: Menorrhagia, Diagnosis: Retroversion of uterus, Operation: Dilatation and Curettage (diagnostic), Hysteropexy, Appendicectomy.

The operative procedure was simple and uncomplicated; and the patient was returned to bed in excellent condition. Ten hours later the temperature had risen to 104°, and the pulse to 120. The patient was somewhat stuporous, but answered questions intelligently—and seemed fairly comfortable. Two hours later she had a convulsion, and had become decidedly more stuporous. The convulsion was generalized and clonic in type, and was frequently repeated until her death five hours later. At the end of a convulsion the patient would become very cyanotic before resuming breathing.

Thirteen hours after operation the temperature was 107°, pulse 140, respiration 28. Patient was given 1200 c.c. salt solution intravenously after first convulsion, but died sixteen hours after operation, with a temperature of 109°. Blood culture negative. Lumbar puncture negative. Postmortem examination negative except for a small heart and aorta and an enlarged thymus. There was no general lymphatic enlargement. Brain negative.

CASE 2.—M. V., Act. 32, married 8 years. Para. 0. Complaint: Pelvic pain. Diagnosis: Fibromyoma Uteri and Chronic Salpingitis. Operation: Myomectomy—(2) Hysteropexy (Kelly), (3) Double Salpingectomy, (4) Right Oophorectomy, (5) Excision Cervical Polyp, (6) Appendicectomy.

Patient left operating room at 10:50 A.M. in good condition. Up to 5 P.M. the pulse rate did not exceed 110. During the evening it gradually rose, and at midnight was 160. The temperature also rose and at midnight was 103.6°. There was marked mental restlessness, mild general convulsions, transient nystagmus and strabismus, typical involvement of hands and feet, as in tetany; at times the general spasm was so marked that the position of the body suggested strychnine poisoning. There was profuse diaphoresis. The patient became comatose, the temperature rose to 107.4°, pulse 160 plus, and she died at 4:45 P.M., about thirty hours after operation.

Sixteen hours after operation patient was given 1000 c.c. normal saline intravenously, and during the next fourteen hours she received three infusions of 500 c.c. each. No postmortem.

CASE 3.—M. M., Act. 30, married 3 years, Para 0. Complaint: Pain in back and left ovarian region. Diagnosis: Retroversion and Chronic Salpingitis. Operation: Hysteropexy, Left Salpingectomy, Appendicectomy.

Patient returned from operation in good condition and remained so until the following morning when the pulse and temperature began to rise and the patient developed typical hand symptoms of tetany, and complained of a peculiar feeling about the muscles of the face. She had considerable diaphoresis, but was not restless mentally or physically.

These symptoms persisted with gradually rising temperature and pulse until her death, about forty hours after her operation. Postmortem refused.

CASE 4.—L. N., Act. 27, married 5 years, Para 0. Complaint: Leucorrhea-pelvic pain—feels weak. Diagnosis: Chronic Pyosalpinx. Operation: Right Salpingo-oophorectomy, Appendicectomy, Plication of round ligaments.

The operative procedure required less than an hour, and the patient was returned to bed in good condition. Pulse and temperature, however, rapidly rose in the twenty-four hours following operation, and the patient died about forty-two hours after the operation with a temperature of 107.5° and a pulse of 160 plus.

The other symptoms were great mental anxiety and apprehension and frequently calling out in a loud voice of seeing fire and of crashing sounds, as of thunder, and of lightning flashes. Marked diaphoresis was present, and the typical hand contractions of tetany with complaint of numbness in legs and peculiar sensation of stiffness in jaw muscles.

CASE 5.—M. P., Act. 29, married 5 years, Para 0. Complaint: Leucorrhea and sterility. Diagnosis: Retroversion and Chronic Salpingitis. Operation: Hysteropexy, Left Salpingooophorectomy, Appendicectomy.

Duration of operation fifty minutes, patient returned to bed in good condition. About six and a half or seven hours later, she began to show the typical hand symptoms of tetany and to seem to be mentally anxious. The pulse and temperature slowly increased so that ten hours after operation they were 101.4° and 122. In the meantime, the cramplike contractions in the hands became more marked and more constant, and there was complaint of numbness, or pins and needles, in legs and

body and of an unpleasant stiffness of muscles of face. These symptoms of tetany persisted without any change for twenty hours, and then calcium lactate gr. 15 and lime water two ounces were administered by mouth every hour for eight doses. In less than four hours after starting this treatment the symptoms had practically disappeared and the patient made a complete recovery.

CASE 6.—C. J., Act. 38, married 19 years, Para 3. Complaint: Lump in abdomen—shortness of breath. Operation: Supravaginal Hysterectomy, Bilateral Salpingo-oophorectomy, Appendicectomy.

Patient was returned from operating room in good condition but about ten hours later developed twitching of hands and feet, numbness in left side of face, extremely restless and anxious, complained of difficulty in breathing, profuse diaphoresis, temperature 103.4°, tachycardia 140, and the typical bilateral cramplike contractions of tetany in both hands. Calcium lactate was administered by mouth, and the symptoms promptly cleared up.

CASE 7. R. S.—Complaint: Pain in epigastrium. Symptoms began twenty-four hours after operation, were intermittent and not very annoying. Rigidity of hands and jaw, spasmodic contractions of hands, also of jaw, especially following nausea, no tachycardia or hyperpyrexia. Trousseau's phenomena present three days after subsidence of symptoms.

These cases occurred irregularly over a period of four months. The first four cases terminated fatally; and, despite thorough postmortems in two of these cases, with careful antemortem blood studies, no positive information as to the probable or exact cause of death was obtained. A most searching investigation was made of all possible sources of infection of a bacterial nature, or poisoning, but without avail. Quite naturally the feeling and the fear of those in charge of the cases was that they were the result of some virulent bacterial infection of unknown origin, and every effort was made to clear up this question.

It was not until the death of the fourth case had occurred, and a comparative study was made of the symptoms present in each, that a tentative conclusion was reached that we were probably dealing with tetany in an unusual form and that it was the result of a toxemia of unknown origin, possibly bacterial; but, in view of the negative findings of the postmortems, more probably chemical.

Later, when the fifth case occurred and the diagnosis of tetany was confirmed by the usual tests, Trousseau's and Chvostek's, the patient was given calcium lactate and she recovered.

In the sixth and seventh cases, as soon as the diagnosis was made, calcium lactate was administered and they recovered.

The symptoms in the fatal cases were tachycardia, profuse diaphoresis, hyperpyrexia, epigastric distress, bilateral, symmetrical spasms and contractions of muscles, especially of the upper extremity, and convulsions.

The prompt recovery of the fifth, sixth, and seventh cases, following

the administration of calcium lactate, satisfied us that we were dealing with a form of tetany toxica of chemical origin.

The source of trouble was apparently finally traced to the glucose and sodium bicarbonate enema administered as a routine to most of the major operation cases. This was supposed to contain 5 per cent glucose and 5 per cent sodium bicarbonate in eight ounces of water at a temperature of 100° to 110° F. It was given as soon as possible after the return of the patient from the operating room, and was repeated again in four hours.

The first enema also contained forty grains of sodium bromide. Through an error in calculation, 1200 grains of sodium bicarbonate was given with each enema instead of 180 grains; and enough of this was absorbed in a short time to upset the normal relations between the sodium, potassium, calcium, and other ions in the neuromuscular tissues, resulting in the symptoms described.

The symptoms in these fatal cases were in many respects identical with those induced experimentally in animals by Münzer, Greenwald, and Binger, after intravenous administration of neutral solutions of the sodium salts (chloride, sulphate, phosphate, and bicarbonate).

Tetany occurred in two cases in children, according to a verbal report from Dr. Rowland G. Freeman, associated with excessive use of sodium bicarbonate, one case of acidosis in which symptoms disappeared on stopping sodium bicarbonate and reappeared on again using it. Another case of pyelitis in which tetany occurred under use of sodium bicarbonate.

Dr. E. B. Sanford states that in 1917, during the administrations intravenously of 1000 c.c. of 5 per cent solution sodium bicarbonate to a very ill case of diabetes with symptoms of acidosis, the patient suddenly, near the end of the infusion, developed symptoms of tetany in both hands, became comatose, and died six or seven hours later. There were no convulsions.

Case No. 7 is said not to have received any sodium bicarbonate, but did receive the glucose and sodium bromide. This patient reports that her sister had similar symptoms, but in her feet, after an operation. This patient also showed Trousseau's phenomena on the day following the disappearance of active symptoms and again two days later. This was probably an instance of latent tetany or latent neuromuscular hyperexcitability brought out by shock of operation. This case had none of the constitutional symptoms of toxemia shown by the other cases and is included here only to emphasize the prompt response to the administration of calcium in this as well as in the 5th and 6th cases.

Binger, following intravenous injections of sodium phosphate solutions of various kinds in dogs, observed marked symptoms, such as fibrillary muscular twitching, tremor, tetany and convulsions. He

emphasized very strongly the fact that the calcium content of the serum was much diminished after the injection of sodium phosphate, and directed attention to the similarity of the symptoms in dogs after the injections of sodium phosphate solutions and after parathyroidectomy, recalling that MacCallum and Voegtlin reported a diminution in the blood calcium in the parathyroidectomized dogs.

Binger says the question of toxicity is a relative one; even sodium chloride if injected in sufficient quantities is toxic.

Greenwald believes that while there may be differences in the symptoms produced by the different salts of sodium, the chloride, sulphate, phosphate, and bicarbonate, they do not differ markedly in their toxic qualities. He believes that the effects of the injection of these solutions are due very largely if not entirely, to the volume of the solutions, the changes in reaction and osmotic pressure which it produces in the blood plasma and in the tissue fluids *and to the increased concentration, both absolutely and relatively, to the other cations, of the sodium ions.*

Münzer reported an extensive series of experiments with a large number of sodium salts, injected in approximately 10 per cent solution into rabbits.

The same general symptoms were obtained with all the salts. The most marked effects were observed in the neuromuscular apparatus. The sequence was increased reflex excitability, fibrillary twitching, tremor, tonic-clonic convulsions with opisthotonus, and death.

Greenwald states that in his experiments with dogs the administration of either sodium sulphate or phosphate, as well as of the chloride, is followed by an increased elimination of chlorides, and that the level of the calcium of the blood is not maintained but falls considerably.

The question of importance to be decided, it seems to me, is whether it was possible for these patients under the conditions described to absorb enough sodium bicarbonate to give rise to the symptoms observed. They had received preliminary catharsis, had received general anesthesia, ether and nitrous oxide gas, had no nourishment except a small quantity of fluid by mouth, and their excretory organs were more or less inhibited or slowed up by the subcutaneous administration of morphine to relieve postoperative pain.

If so, was the resultant condition one of alkalosis due to the administration of an excessive quantity of sodium bicarbonate as in a case of tetany reported by Tileston and also in one reported by Harrop, or was it a condition of sodium poisoning in which the symptoms resulted from a disturbance of the balance of normal relations between sodium, potassium, calcium and other ions?

My own impression based upon the prompt response to treatment with calcium salts is that these were cases of sodium poisoning and not of alkalosis.

BIBLIOGRAPHY

(1) MacCallum & Voegtlin: Trans. Assn. Am. Physicians, 1908. (2) MacCallum & Voegtlin: Jour. Exper. Med., 1909, xi, No. 1. (3) MacCallum & Voegtlin: Jour. Exper. Med., 1913, xviii, No. 6. (4) Kinnicutt, Francis P.: Am. Jour. Med. Sc., July, 1909. (5) Fischer, Hermann: Ann. Surg., October, 1905. (6) Brown & Fletcher: Am. Jour. Dis. of Chil., November, 1915. (7) Stein, Arthur: Interstate Med. Jour., xxiii, No. 12. (8) Proescher & Diller: Am. Jour. Med. Sc. May, 1912. (9) Hyde, C. E.: New York Med. Jour., June 29, 1918. (10) Emsheimer, H. W.: New York Med. Jour., Dec. 28, 1915. (11) Barker: Monogr. Med., iv. (12) Barker: Mod. Med., v. (13) Binger, C.: Jour. Pharm, and Exp. Therap. 1917, x, 105. (14) Greenwald, I.: Jour. Pharm. and Exper. Therap., 1915, vii, 57. (15) Münzer, E.: Archiv. of Exp. Pathol. in Pharm., 1898, xli, 74 (16) Harrop, George A., Jr.: Bull. Johns Hopkins Hosp., March, 1919.

525 PARK AVENUE.

(*For discussion, see p.* 200.)

DRAINAGE OF PUS-FORMING LESIONS OF THE ABDOMINAL CAVITY*

BY J. W. KENNEDY, M.D., PHILADELPHIA, PA.

A STUDY of surgical literature forcibly impresses one by the popularity of certain subjects during definite eras.

We are at the present era living surgically in the region of the upper abdomen; the septic lesions are unpopular on account of an expected heritage of high mortality. The supposedly good excuse we have for bad results and indefinite outcomes in peritonitic surgery is largely illegitimate. This paper is prompted by the large number of patients I see in consultation who have had prolonged drainage, or upon whom I have operated for complications due to inferior drainage and unfinished surgery.

The students of today are being taught that gauze is not a drain and teachers have gone so far in their condemnation of gauze as a drain, that the student is taught to call gauze-drainage "a pus poultice." Answering such teaching in its kind, I prefer to have the pus in the poultice rather than in the abdominal cavity.

In due proportion as operators discarded gauze as a drain, they began to classify more cases as inoperable; and as they grew timid in the use of gauze as drainage of serious abdominal conditions, they became more timid in their toilets of septic abdominal lesions and even more timid in the scope of their surgery which has been followed by multiple operations for the expected complications.

The eternal rule of compensation is ever present, even so, in abdominal surgery a thing half done must be done again.

I have seen during the past ten years the surgical profession travel in a vicious circle in dealing with peritonitic and pus-forming lesions. They have taken from us that most important first hour surgery by substituting a classification of the peritonitic lesions into operative and

*Read at a stated meeting of the New York Academy of Medicine, January 20, 1921.

nonoperative hours. They have confused the general profession through their false premises by teaching that general tenderness and distention means general or diffused peritonitis; they have encouraged later surgery, when lateness has been the great and grave error; and they have done much of this teaching on account of their high mortality in peritonitic lesions which was due to a lack of knowledge of gauze drainage. I am not going into the treatment of the surgical pathology of the peritonitic patient which I have discussed and condemned in a previous publication, but it is my object to point out the virtue and function of gauze as drainage in peritonitic and pus lesions.

In the very first place, before operators can properly use gauze as a drain, they must remove the pathology and take care of the complications, namely, adhesions, complete or partial bowel obstruction, distal abscesses, etc. If they are going to follow the teachings of the so-called physiologic surgeon of this hour who places the peritonitic patient on the waiting list for subsidence of active symptoms, it will not be worth the time of the reader to go further into my discussion as he cannot use our system of drainage without doing thorough work and a finished toilet. I want to say to the profession that the surgery taught and practiced at this hour in the pus-forming and peritonitic lesions, is as far behind privileged surgery as practiced by the late Joseph Price, as it is possible for me to conceive. As operators grew timid in the scope of their surgery, they were necessarily forced to inferior and less radical methods of drainage. One cannot place the coffer-dam drainage until the pathology has been removed, adhesions broken, and proper toilet made, which is all against the advice of the surgery of this so-called physiologic age in abdominal surgery. I am forced to believe that the entire mental attitude of the teachers toward drainage of septic abdominal lesions, is established upon a false hypothesis. One cannot view drainage in the simple sense of a mechanical means of conveying infectious discharges from a local point to the outside world. In other words, one must think beyond rubber tubes, glass tubes, gauze, etc. If one's knowledge of this subject is consumed in the material used for drainage and not the real extent of the surgical pathology he is attempting to treat, then I say he has not learned the first steps of the subject. No one likes pus work, any results seem to be justified.

Complications and multiple operations are expected. The excuse that pus and peritonitis are present is given as a legitimate excuse for any termination. As operators began to classify the peritonitic patient into operative and nonoperative stages, they immediately inherited the later operative hour with more pus and peritonitis and at the same hour began to discard gauze as a means of drainage. The surgeon thus not only willed himself more pus and peritonitis, but discarded the greatest and only means of successfully treating these

very ill patients. I view this as the gravest error the abdominal surgeon has made and he could not have done so had he viewed drainage in its broadest sense. The profession must remember that the simple abdominal incision is drainage, each partial or complete bowel obstruction released is drainage, each and every adhesion broken is drainage, every gangrenous structure removed is drainage, each viscera released from its pathologic fixation releasing pus pockets is drainage, release and elevation of structures from their fixed positions where they are being macerated in collections of pus is extensive drainage, and lastly, the very foundation of drainage is removal of the distal infecting source. Nothing short of all this is drainage. Will the operator now ask himself whether he has properly drained his patient? If he has not gone this far, he is in no position to condemn gauze as a drain. The feebleness of attempts at drainage is the most reprehensible work I see in urgent abdominal surgery. The surgeon who views drainage in a less extensive plan must not condemn gauze drainage, as it is absolutely necessary to go just this far in one's toilet before he can properly drain. Can you drain a perforated appendix which has all the above heritage of complications, if that appendix is not removed? You cannot.

The most unsurgical picture I know of is a drain of any kind placed on top of a mountain of pathology. Please get away from that idea of simply draining the dependent points in a peritonitic abdomen, and remember that infection other than that of metastasis travels by continuity or contiguity of structures, and one finds the filth not necessarily all at the primary infecting source but in continuity with that source. This is sufficiently accurate to be an excellent working factor. For instance, in a supposed diffused peritonitis it would be poor surgery to pass flying buttresses of gauze to both loins and the pelvis because they happen to be dependent points of the abdominal cavity. It would be equally unwise to drain the pelvis if the perforated appendix was high up between right parietes and ascending colon, and it would be wrong to drain the clean pelvis when you had removed a retrocecal gangrenous appendix. Remember please, that any drain placed in the abdominal cavity where drainage is not indicated, is a fertile source of bowel obstruction; truth of indication is strongly bespoken here.

In drainage you cannot anticipate where pus might go or be found and drain with the idea of prophylaxis. It must be apparent to the reader that if the operator fails to seek and to remove the distal infecting source, he cannot use gauze drain. There is no subject so difficult to teach as when and how to properly drain.

Thousands of patients die yearly who could be saved by extensive coffer-dam system of drainage, and I further say that thousands of patients come yearly to surgical clinics who cannot be saved by any

other system of drainage. As operators discarded gauze drainage, the percentage of operability of the peritonitic patient greatly decreased. The cause of this was easily apparent, the drainage tube used in such extensive infections is worth little; indeed, it is not much better than the simple incision. The death rate being high from lack of toilet and inferior systems of drainage, had much to do with the classification of the peritonitic patient into operable and nonoperable stages of the physiologic surgeon who has taken from us thirty-five years' progress in these cases. The "hands off" method of treating these peritonitic patients came from a lack of knowledge of a thorough toilet and a thorough system of gauze drainage, and such teachings still fly under false colors, as it was supposed by the physiologic surgeon that he had done too much and therefore adopted the watchful waiting of today, when in reality he had only made feeble attempts at radical surgery and more feeble attempts at drainage. I have been an unnoticed visitor in clinics and have heard the operator say that he was inserting the famous coffer-dam of gauze of the late Joseph Price. With all respect to such operators, I could not have recognized it as such even though it had been so labelled. I have referred to this previously. So the greatest of all blessings for the peritonitic patient was discarded on account of lack of knowledge of the most important factor in treatment.

I resent this condemnation of gauze as drainage for the peritonitic patient with every cell of surgical sense I may possess. Those who condemn the coffer-dam method of draining the peritonitic patient or those with a great mountain of pathology beginning with the culdesac of Douglas and ending above the umbilicus, are contemptuous of the real facts in the surgical problem. I do not question their motive but their surgical wisdom is without foundation. It is my opinion, indeed to me it is a fact, that the surgery done today in the extensive abdominal infections, is no where nearly so well done as that of twelve to fifteen years ago; and further, the future will bring more timid and helpless surgeons unless the teaching in the peritonitic patient is much revolutionized.

What led up to a discarding of gauze as a drain? First, the rubber gloves gave us the imperfect operations with the big incision through which the entire arm is inserted in exploration for diagnostic failures. The rubber glove prevented removal of the pathology on account of inability to seek and keep in lines of cleavage which is so necessary in order to enucleate pathologic masses and remove gangrenous structures. The pathologic structures not being removed, the coffer-dam drain could not be inserted, this necessitated the inferior tubal drainage which is often placed on the top of the mountain of pathology, a gruesome sight to a disciple of Joseph Price. I knew when operators donned the gloves and became instru-

ment operators and discarded gauze as a drain, the deathknell of the surgery in peritonitic and pus-forming lesions had been sounded and the physiologic surgeon was the product of this vicious circle. He and the phagocyte theory have remained supreme. But, the harder you throw the ball down the higher it will rebound.

Murphy, best known among surgical clinicians, could not remain long on the wrong side and shortly before his death he said, the mortality in appendicitis in the large institutions of our country was much too high and that the profession would have to renew its interests in the subject. The history of the surgical pathology of peritonitis must be rewritten. It is wrong from the standpoint of the true nature of the infection as to manner and source of absorption. It is wrong from the standpoint of diagnosis as to the extent of structure involved. It is much wrong from the standpoint of scope of surgery to meet the condition and it is all wrong in system and method of drainage which particularly concerns us in this paper. I repeat that you cannot view drainage from the simple aspect of conveyance of pathologic filth from a particular source to the outside world.

The mechanics of drainage are all most important and this is where the present teaching has been wrecked.

What is our idea of the function of the properly inserted coffer-dam of gauze in the peritonitic patient? What does it do other than to simply drain, which is the one and only function of any kind of tubal drainage. Suppose we are draining a filthy area from a gangrenous and perforated appendix, or an extensive tubal and ovarian infection complicated by a peritonitis: first, we remove the appendix or the tubes and ovaries as the condition may be. If you are not going to do this you need not further read this article, as I said in the beginning of my discussion that the very foundation of drainage is removal of the distal infecting source; so if you have not done your surgery thoroughly, please do not condemn gauze as a drain, because it has not the handicraft to do your surgery for you.

Those filthy dependent areas from which you have removed the pathology are the areas or points at which you will find the post-operative bowel obstruction or secondary abscesses, if they are not properly drained. The viscera must be held from prolapsing into these filthy areas while the coffer-dam, which is a perfect piece of civil engineering, is inserted. This coffer-dam is a solid wall of gauze filling the pelvis and if the appendix is at fault, this wall of gauze is continued around from the pelvis up under the head of the cecum or to whatever position the appendix has been found.

Remember please, in all cases the coffer-dam is a continuous thing, a solid wall, not two or three columns of gauze going to different dependent areas. It must be apparent that the one half paralyzed, thick, heavy, edematous bowel cannot prolapse into the dependent and

infected areas from which the pathology has been removed on account of this wall of gauze. Again, that portion of the bowel which has been fixed and infected has been elevated, which greatly improves its circulation and repair and of course, drainage. The filthy areas themselves which often become a fatal source of retroperitoneal infection, are the very best drained by the coffer-dam, which at the same time prevents the formation of blood clots in the midst of infection, a very fertile field for bacterial invasion. These filthy, ragged areas, holes or caves, which remain after the pathology has been removed, must be distended with gauze in order that the multiple small abscesses will not form in the wrinkled or collapsing walls which have a tendency to form fissures, crevices or small pockets of pus continuing the infection. Tubal drainage cannot do this. I am of the opinion that were it not for this principle of ballooning the wound with gauze which was used in the Dakin-Carroll method of treatment, the tubes and solution used would not have been nearly so efficacious. It should be apparent that with this system of gauze drainage, the distal or secondary abscesses so often the cause of postoperative bowel obstruction cannot follow.

The indications which I give in the above discussion for gauze as a drain are not met in any particular by any kind of tubal drainage and have had much to do with the failures in teaching this subject. I cannot go into drainage of the particular lesions, but will say in general, that these coffer-dam drains are not touched for at least one week; they are then removed and no secondary or subsequent drains are inserted. These incisions are strapped as tightly as possible and you will be astonished to know that in a certain percentage of these serious infections, the incisions will heal as of primary intention, which so strongly bespeaks the thoroughness of drainage.

If a fecal fistula or pus continues to drain, we never go below the surface of the skin in our toilets of the incisions. No flushing of the incision, even though they are full of feces or pus.

When you are in the abdomen do thorough housecleaning, drain thoroughly, but when you get out stay out; incisions will heal in one third the time by scientifically neglecting them. Trauma of incisions means secondary infection and prolonged drainage. The squeezing of a boil or carbuncle or irrigating and sponging an abdominal incision, are indiscretions of the ignorant. There is a most marked relation between the necessity of drainage and the rewards of the same.

Complete or partial drainage when not indicated, always gives bad results. The very thorough coffer-dam system of drainage when indicated is always followed by fewer adhesions than where inadequate tubal drainage has been used. The most disastrous adhesions come from lack of thorough drainage and incomplete removal of pathology, just what might be expected. I have a good number of times seen the abdominal incision burst open from pus accumulation following re-

moval of tubal and ovarian abscesses where tubal drainage had been used; but have never seen such follow the more thorough coffer-dam drain, a very clear distinction between fertility of kinds of drainage. The most thorough abdominal surgery in peritonitic and pus lesions cannot be done without a thorough working knowledge of gauze drainage.

To speak of gauze drainage as a mere "pus poultice" and condemn it as a drain in the critically ill peritonitic patient, is as void of surgical wisdom as fashion is void of philosophy.

241 North Eighteenth Street.

A BRIEF FOR THE USE OF IODINE IN THE PREPARATION OF WOMEN FOR DELIVERY*

By Burnley Lankford, M.D., F.A.C.S., Norfolk, Va.

ALL obstetricians are in agreement that it is essential to obtain, in so far as possible, an aseptic field for delivery, whether the patient be in a hospital or in her home. There is no question about the wisdom of minute and painstaking care in the effort to prepare such a surgically clean field; there is a question as to the best method of preparation, and there are a number of methods employed.

The object of this paper is, not to inquire into the various forms of technic, as concerns the attending physician, the nurse, the room in which the woman will be confined, or the various and sundry draperies used with which to surround the patient, but to deal with the manner of preparing the patient herself, holding a brief for the use of iodine as a safe, simple, and efficient antiseptic for this purpose.

Anything that simplifies the means for obtaining a desired and desirable end, provided that end be reached with as great efficiency, is an advance in the right direction, and if such, deserves adoption. Any one who has thoughtfully observed the preparation of a patient for delivery by the most universally used method of scrubbing with soap and water followed by the pouring of various solutions from pitchers over the abdomen and thighs, must admit that the employment of iodine is simpler. Observe critically the process of scrubbing. The woman lies on her back, usually with thighs drawn up, her abdomen and thighs towering above the birth area. The nurse, or interne first thoroughly scrubs the thighs, abdomen, pubes, vulva and ischiorectal regions. Sometimes an effort is made to protect the vulval area by holding a pad over the vulva with one hand while scrubbing with the other, this precaution, however, is not always taken and is fallacious at best. As the nurse scrubs and works up suds, these suds contain the mixed

*Read before the Norfolk County Medical Society, January, 1921.

and accumulated filth that lies upon the skin of all the above mentioned surfaces. Holding a piece of gauze as a wash cloth, the rotary motion of her hand when it passes over the vulva, is bound to force some of these suds in between the labia. Where an effort is made to protect the vulva, even then these suds find their way under the protecting pad as can be plainly seen when the pad is removed, just prior to the pouring of the solutions over the patient. Having finished with the scrubbing, a pitcher of sterile water is next poured from above, and the suds, containing macerated epithelial cells, hair, rectal mucus, particles of feces, and bacteria innumerable are carried with a gush, down the hill from the thighs and down the hill from the abdomen into and through the natural drain formed by the gutter-shaped space between the labia majora. No multiparous outlet is so tight as to exclude this sudden freshet, and few nulliparous ones! With the woman lying on her back, the vagina slopes downward and backward, again favoring the reception and final deposit in the culde-sac, around the opening os (possibly into the lower uterine segment itself), of material scrubbed from the lower abdomen, thighs, vulva and anus. Following this, a pitcher full of some mild antiseptic is poured over the parts, and the patient then draped.

There is a significant difference between the preparation of a patient for delivery in the above manner, and that of a patient for some vaginal or cervical surgery, in that, in the latter, *after* the scrubbing and pouring, the vagina itself is scrubbed and douched, and sometimes painted with iodine. I believe it is an established fact that vaginal douches before labor are not indicated, except in the presence of known infection, and if used as a routine would no doubt be productive of more harm than good; therefore, to make use of them after the external cleansing, would not only add a more involved technic of preparation, but also would be a step backward.

The above described procedures require some little time, and the providing of several solutions, as well as causing a good deal of inconvenience to the patient, more work for the nurses, and as usually carried out, does not seem to me, *safe*. I have seen women so prepared in various clinics and think I have given a fair and accurate description.

Let us in comparison examine the method of iodine preparation. The patient is given an enema as soon as she enters the hospital, or if at home as soon after she falls into labor as possible. The anal area is then carefully cleansed, a clean vulval pad applied and the patient is not disturbed with any more ablutions. When well on into the second stage, about the time when she is ready to be put to bed for delivery, the pubes and labia are shaved, using benzine as a softening agent. When the head is markedly distending the vulval ring, probably half a dozen pains before emerging, the obstetrician himself, carefully

paints the vulva, the iodine extending well over the mucus membrane. Particular attention is given to the crevices around the clitoris. Next the skin over the pubes and lower abdomen, the inner sides of the thighs and last, the perineal space, the buttocks and the anus. He then so disposes the sheets and towels that the only surfaces left exposed are those that have been thoroughly painted with iodine. This takes about two minutes, and the patient is, as a rule, sufficiently under an anesthetic at that time to be unconscious of any discomfort. The two occasional disadvantages of this preparation are: sometimes the patient is not anesthetized, or only slightly so, and she will complain of burning. This soon passes or becomes so slight that no more complaint is heard. The other disadvantage is, if one is not careful to use a solution of the tincture weaker than the ordinary pharmacopeial strength (7 per cent), a mild iodine burn will sometimes result: none of those that I have ever seen have caused much discomfort. It is not well to use a solution stronger than one half the regular strength, this is easily obtained by mixing equal parts of alcohol and the U.S.P. tincture. We must admit that this latter procedure is the simpler, and that it is safe. Now as to its efficiency.

Recently I have been taking cultures when the patient had been prepared by iodine as outlined above. The swabs were rubbed over both labia, across the pubes, in the crevices around the clitoris and across the perineum before delivery, and another swab over the same surfaces, after delivery of the placenta and any repair work that may have been needed. These were implanted on slant agar tubes and incubated for 48 hours. Thus far there have been 29 cases, the tubes showing no growth in any except one and that was a mould, the pathologist reporting that it was probably air implanted. I have not made any control cultures from cases prepared by the scrubbing process, these were cases from private practice and are too few from which to draw positive conclusions, but they show an excellent percentage of surgically clean fields, and the method seems worthy of further use.

If we are careful to see that other points in technic, such as the wearing of sterile gowns, caps and mouth protectors, using as much care as possible to avoid rectal contamination, if we further familiarize ourselves with diagnosis by abdominal palpation and rectal examinations, we will have made long strides forward in the safe delivery of the pregnant woman, and the next ten years will show a more hopeful lowering of puerperal morbidity and mortality than the last ten. With the problem of a clean delivery settled, there still remain the problems of those cases having remote foci of infection somewhere within the body, those receiving the infection through the vagina during the last few days of pregnancy, and those infected during the puerperium.

530 Shirley Avenue.

Case Reports

THE BEHAVIOR OF THE UTERUS IN ECLAMPSIA: A CASE REPORT*

By M. Pierce Rucker, M.D., Richmond, Va.

FROM Hippocrates to our own time much has been said and written about the rôle the uterus and its contents play in the causation of eclampsia, but there is not a word in the literature on the behavior of the uterus during a convulsion. From clinical observation we know that when convulsions begin antepartum, labor usually follows, and when they occur in labor the progress is rapid. This, however, is not always the case, as sometimes antepartum convulsions cease and the patient goes on to an uneventful delivery at a subsequent date.

Recently I attended a case that throws some light on this subject:

The patient was a white woman, age forty-two. She had borne one child and there had been no miscarriages. There was nothing important in her history except that she suffered from neuritis in her left shoulder and index finger, and was taking treatment from her physician for the neuritis, when she came to me. She said that she wanted to keep up this treatment, to which I readily consented. Her husband had always been well and gave no history of any skin eruption or rheumatism.

The patient consulted me two months before her expected date of confinement. Her pregnancy except for the neuritis had been perfectly normal. There had been very little nausea, no headache, nose-bleed, sores in her mouth, sore throat, skin eruption, falling out of hair or change in the amount of her perspiration. She was a little short of breath, but had no cough, night sweats, pain or palpitation of heart. Her appetite was good and at the time she came to me there was no nausea, belching of gas or vomiting. Her bowels had been kept regular with an occasional purgative. Her feet had been swelling moderately, and she had been in the habit of rising three or four times at night, but voided without pain.

On examination, head and chest negative. She had an abdominal tumor that corresponded in size and shape to a 32 weeks' pregnant uterus. The fundus reached 30 cm. above the symphysis. The pelvic measurements were as follows: interspinous 25; intercristate 29.5; intertrochanteric 34; external conjugate 21; right oblique 23.5; left oblique 23.5; circumference 92; height from symphysis to umbilicus 22.5; to fundus 30; to ensiform 39; pubic arch wide; tuber ischii 9.25; anterior sagittal 9; posterior sagittal 7; ant. post. 11; depth of symphysis 6; conj. diag. not felt; estimated true conjugate 11.

The perineum showed a slight tear. There was some edema of the labia. The vagina was large. Secretion mucus. The cervix was soft, external and internal os open. The hemoglobin was 80 per cent. Systolic blood pressure, 150, diastolic 90, blood Wassermann four-plus.

On August 2nd, two weeks after her first visit, her blood pressure was 120/80,

*Read at a meeting of the Manchester Medical Society, September, 1920.

the urine was free from albumin and sugar. On August 17 her weight had increased 6 pounds and her legs were swollen up to her knees. She had no headache. Blood pressure was 180/90. Urine was free from albumin and sugar. She was put upon a bread and water diet.

A week later, August 24, in spite of her rigid diet she had gained 8¾ pounds more. Her blood pressure was 205/110 and she was having pains in the back of her head and was seeing specks before her eyes. Her bowels were regular and she was voiding freely. The urine showed a trace of albumin. Specific gravity was 1.006. No casts were found. Fetal heart was 130, Ahlfeld measurement was 26:5 cm., MacDonald 33 cm.

Induction of labor was advised, to which the patient readily consented. She came into the hospital the same afternoon and on admission her systolic blood

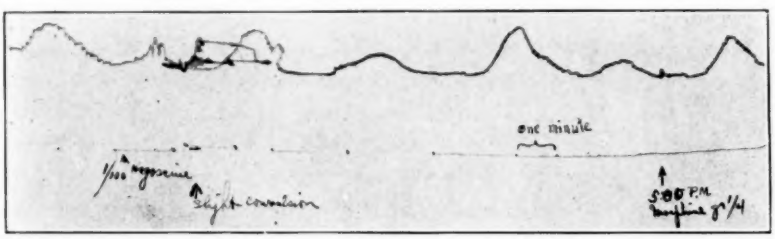

Fig. 1.—Tracing of intrauterine pressure during the first convulsion. The artifact was due to knocking accidentally against the recording drum.

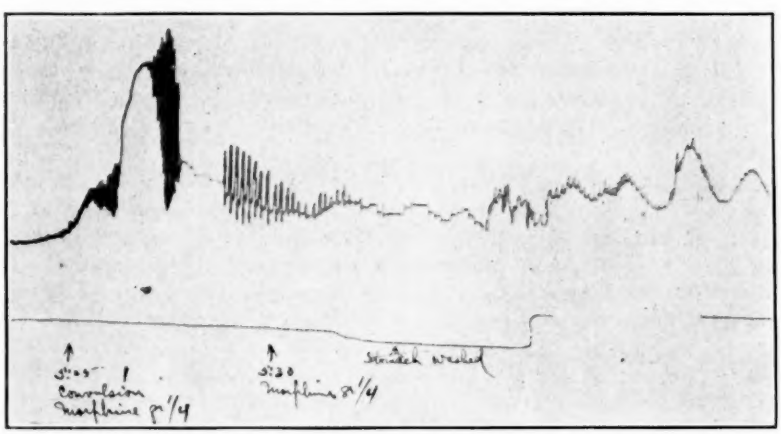

Fig. 2.—Tracing during the general convulsion, showing stage of preliminary clonic convulsion, tonic convulsion, clonic convulsion, apnea, and labored respiration. The greatest intrauterine pressure was 162 mm. of Hg.

pressure was 210. A No. 6 Voorhees bag was inserted and the stem of the bag connected to an ordinary mercury manometer such as is commonly used in physiologic laboratories, so as to get a tracing of the patient's uterine contractions. The patient was given ⅛ grain of morphine fifteen minutes before introducing the bag. At 4:55 P.M., one hour and twenty-five minutes after placing the bag, she was given 1/100 gr. of hyoscine. In a few minutes she had a slight convulsion confined to the muscles of the eyes. Both eyes were directed to the left and upwards in clonic twitchings, this was followed by some cyanosis. She was immediately given ¼ gr. of morphine. Following this the patient had a severe convulsion that started with the eye muscles and extended over the whole body. It quickly passed into a tonic spasm and then again into a clonic convulsion followed by a period of apnea

and deepening cyanosis which was relieved by deep labored respiration. Fig. 2 shows these stages graphically.

The patient was given another quarter grain of morphine, her stomach was washed and two ounces of castor oil was given through a tube. She had a slight convulsion, confined to the eye muscles, just before the stomach tube was used. The patient had six more slight convulsions before the birth of the baby at 7:37 P.M. She was given the third ¼ gr. of morphine at 5:47 P.M. which made a total of ⅜ grs. of morphine during the afternoon. The only other treatment she received

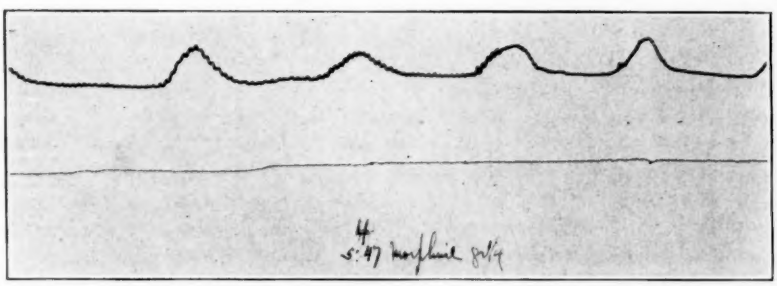

Fig. 3.—The patient had a convulsion confined to her eye muscles, at the point marked "4." Note that there was no effect on either the strength or the rhythm of uterine contractions.

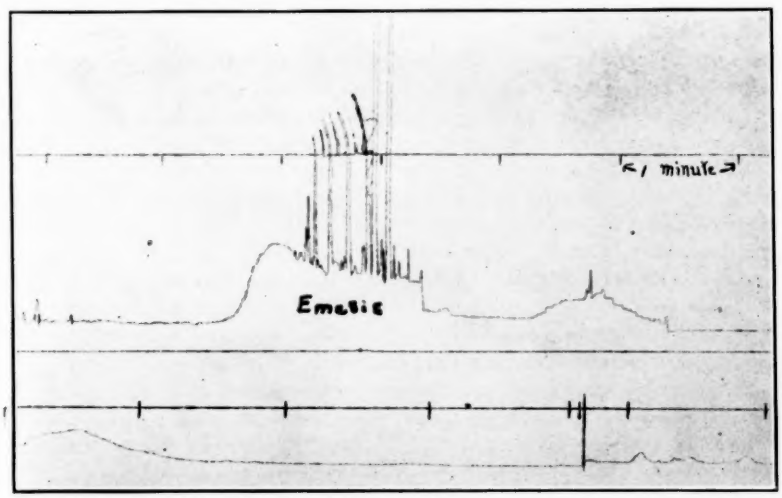

Fig. 4.—Tracing of another patient during a vomiting spell. Note the similarity to the clonic stage in Fig. 2. The greatest intrauterine pressure was 162 mm. of Hg.

was proctoclysis, a 5 per cent sodium bicarbonate solution being used. During the labor the patient's pulse dropped from 160 shortly after her hard convulsions to 82. The respiration was kept down to 14 or 16 per minute with morphine. The blood pressure at 6:20 P.M. was 160/110. The fetal heart remained at 130 throughout the labor.

The bag came out at 7:02 P.M. The waters were ruptured and a hand prolapsed. Without any anesthetic, forceps were slipped on the head, which was in midpelvis and an easy delivery effected. The perineum was not lacerated. The patient had a slight convulsion in the third stage of labor.

The child, a male, breathed after 40 minutes' artificial respiration with a lung motor. He weighed six and a quarter pounds and measured 50 cm. in length.

The child lived 10 hours and in that time had several spells of rigidity (whether due to morphine or toxemia, I cannot say). Autopsy showed several large infratentorial blood clots.

On August 28, I made the following notes. The patient has been conscious and has felt well ever since the morning after her baby was born, but her blood pressure has not gone below 185. Yesterday, August 27, at 11 A.M. she was given a slice of toast and a cup of coffee and she has had one slice of toast since. Towards evening she began to complain of headache and pain in her breasts. At 2 A.M. patient complained to the nurse that she had spots before her eyes, and that her right hand jerked so she could hardly get hold of the bell. In about 10 minutes she said she felt real badly and wanted to see the doctor. She then went off into a severe clonic convulsion. A quarter grain of morphine was given at once and two more doses of the same size in rapid succession. When I saw her after the third hypodermic she was breathing 19 to the minute, rather stertorously, pulse was 88. She could be aroused and talked perfectly clearly, saying she felt well and did not mind being starved. A stomach tube was introduced, but the flow returned clear. Two ounces of Epsom salts were given per tube. It was then noticed that her pulse had gone up to 100 and in five minutes to 104. She was given the fourth ¼ gr. morphine hypodermic and a few minutes later (4:15 A.M.) had a hard convulsion. As the convulsive movements wore off, and before the apnea and marked cyanosis disappeared the patient repeatedly winked her right eye. The right arm was the last part of her body to stop jerking. During the apnea the pulse was scarcely palpable. At 4:30 A.M. her pulse was 94, and at 4:35 A.M. it was 88, at 5 A.M. pulse was 104. Patient was given ¼ gr. morphine. At 5:30 she had a convulsion and again at 6:00 and at 8 A.M. At 9:30 she was given one pint of sodium bicarbonate solution per rectum and this was repeated every two hours throughout the day. Patient had the eighth postpartum convulsion at 1:10 P.M. and her ninth at 1:45. Each of these lasted ten minutes, but did not leave the patient comatose. She has had all told 2⅓ grains of morphine within 24 hours and her blood pressure was still high (210/110). Patient was given four minims of veratrum viride which was repeated in five minim doses every hour until the blood pressure dropped to 175/108, and pulse to 84, which occurred at 7 P.M. (August 28.) She had seven bowel movements during the day, some involuntary. Urine (per catheter) was clear, 1.024, acid, marked trace of albumin, reduced Fehling's solution and fermented with yeast. One or two hyaline and granular casts were seen to a low power field together with amorphous and triple phosphates.

In the afternoon of August 29, the pulse rose to 100 and the blood pressure 200/105. I ordered five minims veratrum viride per mouth and agreed that patient might have water as she complained of being very thirsty. In five minutes she had a hard convulsion. Fifty minutes later blood pressure was 205/100, pulse 92. At 12:45 A.M. (August 30) she had another convulsion and her blood pressure went up to 220/100. Four hundred fifty c.c. of blood was taken from vein and her blood pressure dropped to 185/100, but slowly rose again to 205/100. At 4:40 A.M. when she had another convulsion, 250 c.c. of blood was withdrawn and in 40 minutes 500 c.c. more and the blood pressure fell to 175/85. At 6:00 A.M. the blood pressure was again 200/100. It was noticed that before each of the convulsions the patient regained consciousness and except for the high blood pressure seemed better in every way just before the onset of convulsions.

On August 30, the sixth day after delivery, Dr. Gayle was called in and found a suggestive Babinski on left side with fine tremors of the eyes. At 7:50 A.M. he punctured the spinal canal and removed about 40 c.c. of clear fluid. The spinal fluid was found to be under considerable pressure. The laboratory report on the spinal fluid was: cell count 3, lymphocytes 3, globulin ++++, Wassermann negative. Before the puncture the blood pressure was 195/95, pulse 100, and immediately afterwards the blood pressure was 170/80, pulse 78. This, however, was only temporary and

in a few hours blood pressure rose and the pulse became rapid. It was controlled exceedingly well with nitroglycerine, grs. 1/100 placed on the patient's tongue. This caused a drop in systolic pressure from 190 to 120 in 30 minutes. The dose was repeated whenever the systolic pressure went above 180 and the patient had no more convulsions. She made an uninterrupted recovery except for her vision. On Sept. 22nd Dr. Hill found her visual fields to be contracted, especially in each right, upper quadrant. There was a pronounced arteriosclerosis in the retina, and a slight exudate on the optic disc, the edges of which were hazy.

There are several interesting features in this case. In the first place, the convulsions reappeared on the fourth day postpartum, very shortly after she was given nourishment by mouth. This was very similar to a number of cases Tweedy cites in support of this theory that food in the stomach is the exciting cause of eclampsia. But my patient had complained of a pain in the breasts just before going into her first postpartum spasm, and engorgement of the breast may just as well have been the exciting cause in this instance.

Another interesting feature in this case is the effect of nitroglycerine upon the blood pressure, and seemingly, also upon the convulsions, when morphine, veratrum viride, bleeding and spinal puncture had afforded only temporary relief.

The most interesting feature, however, is the tracing of the uterine contractions. When the convulsions started there was no time to disconnect the apparatus, and when things had calmed down it was deemed best to leave the bag in, to favor dilatation, and the tracing was continued. I was very much surprised to find that the slight convulsions, those limited to the ocular muscles, had no effect upon the uterine contractions. The hard convulsion showed beautifully upon the chart, but upon comparing this tracing with the tracings of other patients, such as is shown for instance in Fig. 4, a case of emesis, it will be seen that the part played by the uterus is entirely passive. The great rise in the intrauterine pressure that is recorded by the manometer is due entirely to the action of the voluntary muscles and the diaphragm.

1600 Park Avenue.

REPORT OF TWO CASES OF FIMBRIAL CYSTS: ONE WITH TWISTED PEDICLE AND GANGRENE COMPLICATING PREGNANCY AND ONE SIMULATING AN ECTOPIC GESTATION

By Harry Cohen, M.D., New York City

THESE two cases present many unusual and interesting features. A review of the literature shows the first case to be of very infrequent occurrence. Although these cysts are histologically fimbrial, clinically they have for a long time been called parovarian. Eden and Lockyer[1] in describing these cysts state "the term fimbrial cysts is therefore here used as the title of those cysts which have previously been described as parovarian."

CASE 1.—FIMBRIAL CYST WITH TWISTED PEDICLE AND ACUTE APPENDICITIS IN A WOMAN FIVE MONTHS PREGNANT*

M. R., aged twenty-three, Russian, lifted a heavy mattress from the floor to the bed on the night of May 3, 1920, and immediately felt a sharp pain in the right lower quadrant of the abdomen. She was unable to leave the bed the next morning because of the pain, and vomited about ten times that day. Several physicians were called and morphine and application of an ice bag were ordered. There was, however, no relief from pain which now extended to the right kidney region. These symptoms continued to May 6 when, about 9 P.M. I was called to see her. In addition to the above, the following history was obtained: Married four years and has one child two and one-half years old. Her family and previous history are negative. Menstruation occurred every four weeks, lasted three days, and was never painful. Was now five months' pregnant. Never previously complained of pain in the abdomen or of any urinary symptoms. On physical examination there was marked tenderness and rigidity in the right midrectus region, also moderate tenderness in the right kidney region. Vaginal examination showed the uterus five months' pregnant, also marked tenderness in the right fornix. No mass was palpable owing to tenderness. Temperature was 100.4° F. and pulse 96.

She was immediately removed to the People's Hospital. A blood examination showed 14,400 white cells with 78 per cent polynuclear cells and a urine examination performed with the object of eliminating a pyelitis complicating pregnancy, complicated the diagnosis by showing heavy albumen, a large amount of blood and pus cells and no casts, kidney or bladder cells. However, feeling certain of the existence of an acute surgical complication, I operated. A right rectus incision was made and on opening the peritoneal cavity, a large amount of serosanguineous fluid escaped. On exploration a large, hemorrhagic, blackish, cystic mass was found. The size was about that of a tennis ball. It was found attached by a pedicle which was twisted to the broad ligament between the tube and ovary. The tube and ovary were normal in appearance. The mass was excised without disturbing the tube, ovary or fundus. The appendix was very long, markedly injected, considerably distended, and the seat

*Presented at Clinical Meeting of the People's Hospital, May 12, 1920.

of an acute catarrhal inflammation. Appendectomy was performed and the wound closed up. The patient made an uneventful recovery. The urinary findings disappeared soon after the operation. The cause for this blood and pus in the urine was a pyelitis which cleared up as soon as the irritant was removed.

The *Pathological Report* by Dr. Alex. Fraser, was as follows: "The cyst is in the broad ligament immediately under the tube. The surface is smooth, dull, and dark red in color. It is oval in shape and measures seven by five cm. One bunch of fimbriæ projects over the end of the cyst about three-quarter cm., a second bunch emerges from the cyst wall about one cm. further back, and still further back about one cm. there is an attached pedicled hydatid of Morgagni. These features serve to determine the origin of the cyst as from the ovarian fimbria of the tube. These cysts are usually called parovarian, but it has been shown by Keith that they are really fimbrial. The cavity of the cyst is filled with blood clot and the mural tissue is suffused with blood.

"*Histology.*—The tissue of the wall is necrotic and suffused with blood and polymorphonuclear leucocytes. Remnants of plain muscle fibers can be identified.

"*Diagnosis.*—Strangulated and gangrenous fimbrial cyst.

"*Appendix.*—The appendix is firm and swollen. It measures eight cm. by three-quarters cm.

"*Histology.*—Marked lymphoid hyperplasia encroaching on and causing atrophy of glands and musculature. The interstitial lymph vessels are stuffed with lymphocytes. The epithelium shows marked catarrhal distention and desquamation. In a few foci there is marked edema of mucosal stroma and hemorrhage in the lymph follicles.

"*Diagnosis.*—Subacute catarrhal appendicitis with acute exacerbation."

This case presents three interesting features: First, the presence of this parovarian mass complicating pregnancy; second, the complications which may occur at any time to tumors of the ovary or parovarium, and third the effect of ovarian operations on coexisting pregnancy.

Cases of parovarian cysts are relatively infrequent. Wiener[2] in a thorough study of ovarian tumors found 10 cases of parovarian cysts out of 269 cases studied.

The second consideration in these tumors is the complications. In Wiener's 269 cases, torsion was the most frequent, occurring 33 times and going on to gangrene in three cases and "In only one case the entire cyst wall was black and necrotic." In five of the cases there was free fluid in the abdomen but in none was there a severe peritonitis. Rupture, hemorrhage, infection and malignant degeneration were some of the other complications. Pregnancy was present in eleven cases. It is therefore evident that a parovarian cyst with torsion and gangrene and free fluid in the peritoneal cavity and complicating a pregnancy is an extremely rare condition and a fairly careful search of the literature fails to show a similar case. Parovarian cysts are usually sessile, but cases with pedicle and torsion are described by Kelly.[3]

Waters[4] reported a case of torsion of an enlarged hydatid of Morgagni and Oginz,[5] of a large subserous tubal cyst with torsion and gangrene simulating an ovarian cyst with a twisted pedicle.

The third and last consideration is the relationship to co-existing pregnancy both from a mechanical and physiologic viewpoint. Me-

chanically considered, many writers have frequently encountered ovarian cysts complicating labor at term. At this period ovarian cysts may become a menace to life of both mother and child. Humpstone[6] reports a case that required cesarean section. Aranow[7] reports two cases, in one of which the life of the child was sacrificed. Beach,[8] in an exhaustive review, concludes that all ovarian cysts complicating pregnancy should be removed as soon as the diagnosis is made. He claims that abortions will occur even under expectant treatment and cites figures to prove this contention.

Physiologically considered, most observers agree that after the fourth month of pregnancy, when the corpus luteum has fixed the structures within the uterus, oophorectomy may be performed without interrupting the pregnancy. Polak[9] reports three such cases: Holden[10] one.

There is a considerable amount of literature to prove that pregnancy may go on uninterrupted even when operations on the ovary take place before the fourth month. In Wiener's cases nine were operated before the sixth month with only one abortion, which occurred eleven days after a salpingo-oophorectomy. He reported the interesting observation that in one case the only corpus luteum was removed and in another the sole remaining ovary was excised and yet neither resulted in an abortion. He also quotes Lowenstein who removed an ovary for a dermoid. The patient subsequently became pregnant and in her third month the other ovary was removed for large cystic degeneration. Pregnancy went on uninterrupted and an eight pound child was delivered at term. The child was nursed for eighteen months. Menstruation never returned. Brothers[11] reported a case in which he removed a large intraligamentous cyst and performed a bilateral oophorectomy during early pregnancy without interrupting gestation. Grad[12] did an ovariotomy and myomectomy early in pregnancy and obtained a full term delivery. Lastly, Findley[13] describes a case of menstruation without ovaries but concludes, however, the probability that some ovarian tissue must have been present.

CASE 2.—FIMBRIAL CYST SIMULATING ECTOPIC GESTATION

This case represents one with typical pathology of a parovarian cyst, of about the size of a fist. Of interest in this case is the history and preoperative findings which simulated ectopic gestation.

Mrs. M. K., aged twenty-three, consulted me February 23, 1918. Her chief complaint was pain in the right lower quadrant of the abdomen. Her general history was negative. Was married and had two children. Her menstrual history was normal until the present illness. At this time she was two weeks overdue. Vaginal examination showed the fundus slightly enlarged and moderate tenderness in right fornix. I did not feel any mass in the right fornix at this time, although from subsequent findings one must have been present. On March 9 I was again called to see her. She now had very acute pain and tenderness in the right lower quadrant of the abdo-

men, had been bleeding vaginally the past few days, and on vaginal examination, a soft and very tender mass was felt in the region of the right tube. She was admitted to the Community Hospital with a diagnosis of unruptured ectopic gestation, presenting the four cardinal symptoms of pain, missed period, vaginal bleeding and the presence of a mass in the right fornix. On opening the abdomen I found a

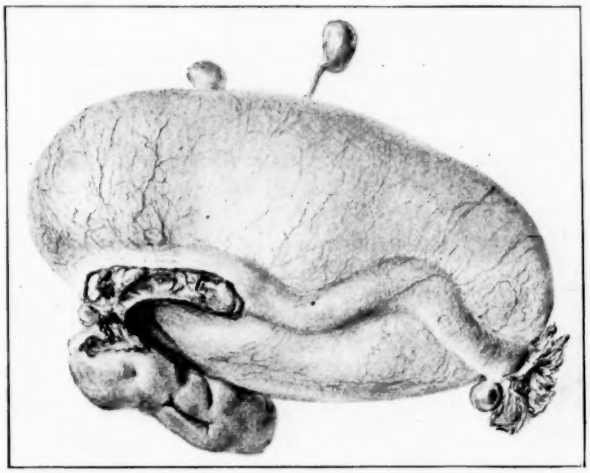

Fig. 1.—Showing parovarion cyst (Case 2) with tube imbedded in cyst wall.

typical fimbrial cyst of the right side with the ovary normal and the tube elongated, stretched and embedded in the upper surface of the cyst wall. The mass was removed intact and consisted of tube, ovary, and parovarian cyst. An uneventful recovery followed.

That ovarian tumors may cause irregularity in the menstrual flow is a well recognized fact. A case of parovarian cyst that caused irregular and profuse menstruation was reported by Stone.[14]

To conclude, fimbrial (parovarian) cysts, while considerably less frequent than ovarian cysts, are subject to the same complications and should be removed whenever discovered, pregnancy not being a contraindication.

REFERENCES

(1) Gynecology for Students and Practitioners, New York, 1920, MacMillan Co., ed. 2, p. 711. (2) Am. Jour. Obst., 1915, lxxii, p. 209. (3) Operative Gynecology, New York, 1906, D. Appleton & Co., 2 ed., ii, p. 315. (4) Jour. Am. Med. Assn., 1919, lxxii, p. 1072. (5) Am. Jour. Obst., 1919, lxxx, p. 558. (6) Am. Jour. Obst., 1916, lxxiii, 1116. (7) Am. Jour. Obst., 1916, lxxiii, 530. (8) Am. Jour. Obst., 1916, lxxiii, 1029. (9) Am. Jour. Obst., 1918, lxxvii, 982. (10) Am. Jour. Obst., 1916, lxxiv, 315. (11) Med. Record, Aug. 18, 1906. (12) Jour. Am. Med. Assn., Nov. 27, 1909. (13) Am. Jour. Obst., 1912, lxvi, 44. (14) Am. Jour. Obst., 1912, lxvi, 825.

Sixty-Four East Third Street.

A HISTOLOGICAL STUDY OF FETUS AND IMPLANTATION SITE IN A CASE OF MISSED ABORTION

By J. P. Greenhill, M.D., Chicago, Ill.

From the Carnegie Laboratory of Embryology, Baltimore

THE unique specimen which is herein described is of particular interest not only because abortion failed to occur for 20 weeks after development had ceased, but also because the conceptus was obtained *in situ* and therefore afforded an excellent opportunity to observe what changes had taken place in the membranes, the placenta, and the placental site, after the death of the fetus.

The question naturally arises, which degenerated first, the fetus or the placenta? Mall (1917) states that "when we consider the whole ovum, it is the embryo itself which is first destroyed." Meyer (1919, a) agrees with this statement, and the study here reported also supports Mall's contention.

CASE REPORT

On August 21, 1917, (F. N., No. G-2322), Russian, aged thirty-four, married, was admitted to the Hebrew Hospital, Baltimore, complaining of absence of menstruation. Her past history was entirely negative. She had been married nine years and had four living children. All labors and puerpera had been uneventful. She had had no miscarriages. The patient's last menstrual period before admission to the hospital began Dec. 25, 1916. The bleeding, which was profuse, was accompanied by severe pain. This period lasted four days as usual. After this occurrence, there was an amenorrhea for three months. During this time, there was morning nausea and vomiting. At the end of the three months the patient took a few hot mustard foot baths with the intention of bringing on uterine bleeding. Nothing occurred until six days after these baths, when the patient began to bleed in small amounts. Not satisfied, she went to a physician who gave her some medicine, after which the bleeding ceased. This cessation, however, was only temporary, for the bleeding recommenced and continued at irregular intervals until the time of operation.

Because of the metrorrhagia and the assumption that she had been pregnant, coupled with the fact that her abdomen had diminished in size rather than increased, the patient believed she had had a miscarriage. However, she had not at any time experienced pains suggestive of labor pains. Neither had any tissue been passed which resembled a fetus or membranes.

During the few months previous to admission, the patient had complained of anorexia and fetor oris. There had been occasional chills but no fever.

Since eight months had passed without the occurrence of a regular menstrual period and since there had been no fetal movements or marked abdominal enlargement suggestive of advanced pregnancy, the patient came to the Hebrew Hospital Dispensary to learn the cause of her amenorrhea.

Physical Examination.—The general examination was essentially negative. From both breasts a small amount of whitish watery secretion could be expressed. Abdominally, a smooth mass, evidently arising in the pelvis and extending up to the umbilicus, was felt. Vaginally, a bloody discharge was noted and the mass felt

abdominally proved to be an enlarged uterus. The temperature on admission was 99.5°, pulse 88, respirations 22 and blood pressure, 100-78. The urine was negative, as was also the Wassermann reaction of the blood. The impression recorded was, "Myomata uteri, submucous, or missed abortion."

Operation.—On the day after admission an operation was performed by Dr. Alfred Ullman, and the uterus, tubes and appendix were removed. In the operative note was found the statement, "On elevating the uterus, it was found to be symmetrically enlarged, congested and looked like a pregnant uterus." A hysterectomy was performed by Dr. Ullman because the gynecologist in charge believed the patient had a submucous myoma.

Course in Hospital.—The convalescence was entirely uneventful and the patient left the hospital on the twenty-first day after operation, feeling very well.

The patient was seen and examined by the writer in October, 1920. Her general health was very good and examination failed to show anything unusual.

Fig. 1.—The specimen after preservation in formalin. The uterus and amniotic sac had been opened at operation.

DESCRIPTION OF SPECIMEN

The specimen is now in the Carnegie Laboratory of Embryology (No. 3024). When first seen it was found preserved in formalin (Fig. 1). The uterus had been opened and also the amniotic sac. The operator informed the writer that no amniotic fluid was found when the amniotic sac was opened at the time of operation. The fetus occupied the upper half of the uterine cavity and, as seen in the illustration, it presented as a complete breech.

This fetus belongs to the seventh group of pathologic embryos according to Mall's classification, the group being characterized by maceration of the tissues with marked distortion and deformity of the extremities and body parts.

The crown-rump measurement is 90 mm. and the foot length is 13 mm. The weight of the fetus is 24.4 gms., as contrasted with 50 gms., which is the average weight for fetuses with a crown-rump length of 90 mm. From this data, according to the Carnegie curve of growth, (Streeter, 1920), the estimated age of the fetus is between 14 and 15 weeks. However, the menstrual age, (Mall, 1918), that is, the age of the fetus as computed by the time elapsing between the beginning of the last menstrual period and the date of operation, is 34 weeks. We have therefore, a discrepancy of 20 weeks between the estimated and the menstrual ages.

In its general appearance, the fetus presents the typical mummified condition which is frequently met with in specimens belonging to this group. The sex could not be determined because of the marked degeneration in the region of the external genitalia. The skin almost everywhere is dry, rough and granular, as if something had been in contact with the fetus. The only smooth area is on the face. The color of the skin is greenish brown. It is very closely applied to the bony structures and is rubbery in consistency. The entire fetus is flattened, the width of the skull being only 19 mm. The head is markedly flexed, anteriorly and laterally, on the chest, and the extremities have assumed very peculiar attitudes. The arms are partly extended

Fig 2.—The fetus, showing typical mummification. The skin is dry, rough and granular and is closely adherent to the bony structures. Note the peculiar attitudes of the extremities.

Fig. 3.—Left profile of fetus showing the fontanelles and characteristic posture of a mummified fetus.

from the shoulders, the forearms are very acutely flexed on the arms and the hands are hyper-extended on the wrists. Both hands rest on the neck under the chin and are markedly flattened (Fig. 2). The thighs are flexed on the abdomen, the legs are flexed on the thighs and the feet are flexed on the legs.

The head is flattened and the fontanelles and sutures are preserved. The ears are barely recognizable, while the eyes are deeply sunken and are covered by a thin membrane. The nose is flattened. Both nostrils look forward as small pinpoint openings and the face presents an atrophied or senile appearance. The body of the fetus is elliptical in outline, the greater diameter being the anteroposterior one.

An x-ray of the fetus revealed a normal condition of ossification for a fetus of 14 weeks and no deformities or anomalies of the bones.

The placenta occupies the entire posterior wall of the uterine cavity and measures 80 by 61 mm. It is firm, whitish gray and its greatest thickness is 18 mm. The umbilical cord is inserted centrally. The cord is markedly twisted as is characteristic

of mummified fetuses. This is especially obvious near its insertion, where it narrows down to a diameter of 2 mm. The greatest diameter of the cord measures 6 mm. The membranes are dry and shrivelled up.

MICROSCOPIC STUDY OF THE FETUS

The sections were cut so that the important organs of the body could be studied. These sections were stained with (1) hematoxylin and eosin, (2) hematoxylin, eosin, aurantia and orange G, (3) iron hematoxylin, (4) iron hematoxylin borax ferricyanide, (5) Mallory's stain alone, (6) Mallory's stain and picric acid. In general, all the tissues save bone, cartilage, and muscle took the strains poorly.

Skin.—The outermost layer of the body consists of tissue of varying width, very granular and partly hyalinized. No distinct cellular structure is definable. This layer has a very irregular surface and stains very poorly. Beneath it, however, for a short distance in the region corresponding to the axillary space, can be seen a semblance of skin. There is a layer of epithelial cells, four to five cells in thickness, very much degenerated and granular. The cell outlines have practically all disappeared and the nuclei are discernible with difficulty. The stain is poorly taken. This layer is wavy and is almost entirely separated from the underlying tissue. There is no evidence of hair follicles or sudoriparous glands, but a few small round cells are scattered here and there.

Subcutaneous Tissue.—Between the external layer and the striated muscle on the dorsum of the body is a layer of tissue almost three times as thick as the external stratum. This is composed of very fine granules in which can be seen numerous degenerated nuclei.

Muscle.—The striated muscles are very well preserved, the cross-striations being readily discernible. The diaphragmatic muscles, like the striated musculature elsewhere, is in good condition. The muscle sheaths are preserved and the lumina of the blood vessels are patent.

Bone and Cartilage.—These are the best preserved tissues in the body, the entire structure being perfectly retained. The vascular channels in the bodies of the vertebrae stand out prominently and are found to contain degenerated blood cells and fibrin. There are distinct centers of ossification at the bases of the transverse processes, in the bodies of the vertebræ and in the ribs.

Spinal Cord.—The central nervous system shows the most pronounced degeneration of all the tissues. The cytoplasm has entirely gone to pieces. In a few areas the tissue has undergone coagulation necrosis, but the larger portion of the cytoplasm is replaced by innumerable fine granules. No definite cell structure is recognizable. Nuclei in various stages of degeneration are seen everywhere. However, a large number of nuclei are well preserved. No definite distinction between white and gray matter can be made with certainty. There is no central canal or any trace of the anterior and posterior fissures, or the anterior and posterior roots to be seen. (Perhaps the cause for the early decay of the central nervous system was the lack of a firm connective-tissue framework.)

Meninges.—The meningeal membranes seem to be fairly well preserved and the blood spaces are patent. There is a conspicuous paucity of round cell infiltration in the spinal cord and meninges.

Liver.—The capsule is poorly preserved, but the general configuration of the liver lobules is readily discernible. The individual liver cells are muddy and degenerated, the degeneration being in the form of vacuolization and granule formation. Most of the cell outlines are vague. The stain has been poorly taken and few nuclei can be seen. The connective tissue septa are fairly well preserved, but the blood vessels have collapsed. The degeneration is appreciably more marked in some areas than in others. No round cell infiltration is noticed, but numerous fat globules are seen. No distinct bile capillaries or blood-forming cells are distinguishable.

Stomach.—The peritoneal covering of the stomach has practically disappeared. For the most part the three muscle layers are distinct and fairly well preserved, but in a few areas there is marked degeneration. The nuclei of the muscle fibers are in a fair state of preservation. Internal to the muscle layer a thin submucosa is perceptible. Of the gastric mucosa practically nothing recognizable remains and in its stead is a wide stratum of very finely granular débris, in which there is a dearth of distinct, intact cells. Glandular structures are almost entirely absent in this layer. Only a few shadows of epithelium are seen. The gastric cavity is filled with detritus of various kinds, mostly degenerated epithelial cells. Some of these cells are arranged in the form of glands or portions of glands. The nuclei in these cells are fairly well preserved. Numerous fatty acid crystals are seen.

Pancreas.—This organ has undergone striking granular degeneration. Distinct alveoli are not seen but the general contour of alveoli is maintained. Intact individual cells are seen with some difficulty. Most of the cells are granular, dull and stain very poorly. The connective tissue is much better preserved than the pancreatic cells. Blood vessels are few in number, but those present are patulous. No epithelium is visible in the pancreatic duct, but its lumen is filled with granular débris. Islands of Langerhans are not discernible.

Spleen.—Practically all the splenic pulp has been converted into a very finely granular degenerated mass which stained poorly. In a few areas, which are more homogeneous, fine needle-like crystals, probably fat crystals, are present. The walls of the blood vessels are thickened but the lumina are patent. The blood vessels, however, are few in number, and there is only a suggestion of malpighian bodies. The capsule is missing over the greater portion of the spleen, and at one point, there is firm union between the spleen and the pancreas.

Adrenal Glands.—The capsule and the architecture of the adrenals are very well preserved. It is possible to distuinguish the medulla and the cortex. The hilum and cell columns stand out prominently, and in general the stain has been fairly well taken. The individual cells, however, are extremely granular and very few nuclei could be made out. Scattered throughout are small areas of grossly degenerated cells. A golden brown pigment is deposited in various portions of the parenchyma and in the connective tissue septa. Very few patent blood vessels can be seen.

Lungs.—The general structure of these organs is very well preserved and the visceral pleura stands out prominently. Connective tissue is strikingly abundant, well preserved and fairly well stained. The spaces between the connective tissue septa are filled with innumerable round, detached cells which are densely packed and do not stain well. These are degenerate cells, no nuclei being visible in them. Very few bronchioles are seen and these can be identified only with difficulty. No blood vessels can be recognized with certainty in the sections studied.

Heart.—This organ is markedly degenerated but not to such an extent as the central nervous system. The shape of the heart is retained but the cardiac musculature is very poorly preserved. Nevertheless, heart muscle fibers can be recognized, branching is visible, and a few fibers show faint striations. No distinct cardiac chambers can be made out and no endocardium can be differentiated. A thickened pericardium which blends with the visceral pleura, is distinctly visible.

Aorta.—In contrast to the heart, the aorta is very well preserved. It contains abundant elastic tissue which stains well and the intima is almost intact. The lumen of the vessels is patent and contains practically no blood cells or detritus.

MICROSCOPIC STUDY OF PLACENTAL SITE, PLACENTA, AND MEMBRANES

At the placental site, as elsewhere, the uterine musculature is very well preserved. The cytoplasm and nuclei are distinctly visible and the blood vessels are normal. Between the muscle layer and the placenta is the decidua basalis. Most of the glands in the spongiosa are widely distended and a few extend deep down into the muscu-

lature. The connective tissue between the glands is diminished to thin trabeculæ. The epithelium lining the gland cavities is either cubical or flattened out, so as to resemble endothelium. In a few glands the epithelium is separated from the basement membrane or is missing entirely. Some of the glands contain blood, desquamated epithelium and coagulum. Between the spongiosa and the muscle layer are numerous blood sinuses. In the spongiosa and extending downward into the uterine musculature for a short distance one sees sparse round-cell infiltration. Of the compacta very little remains. The decidual cells in the basalis are distinct, fusiform, clearly stained, and lie parallel to one another, arranged like chains, with their long axes perpendicular to the muscle layer. One portion of the basalis shows marked degeneration, the center of this area being almost completely hyalinized. There are a few small, papilla-like projections of decidua which extend upward toward, and mingle with, the chorionic villi. The superficial portions of these projections have undergone hyaline degeneration and have blended with the hyaline surrounding the villi.

The *villi* vary considerably in size and shape. There is very marked fibrin formation around and in the peripheral portions of most of them. In the majority of villi the fibrin is just beneath the chorionic ectoderm. There is no Langhans layer in most of them and in many even the syncytial layer has disappeared. In the latter villi a large amount of fibrin surrounds the stroma. Many of the villi show some edema and a few have undergone almost complete hyalinization. Very conspicuous is the almost entire absence of villous blood vessels or the remains of blood vessels. The few that are present are almost entirely obliterated and their walls show hyaline degeneration. In the stroma of the villi are seen numerous Hofbauer cells in various stages of degeneration, and these cells, most authors agree, are indicative of progressive degeneration. (Meyer, 1919,b.) Villi are joined to the basalis by fibrin almost everywhere. Scattered throughout the placenta are small calcified areas, syncytial buds and free masses of syncytial cells.

The *intervillous space* is filled with red blood cells, but these are mere shadows, for practically no hemoglobin can be seen in them. In this space there is a moderate number of small round cells.

The *chorion*, which is festooned, is almost entirely intact. Two distinct layers of epithelium are discernible in most places. The large cells of the Langhans layer have disappeared in a few areas. The syncytial layer is well preserved. Fibrinous degeneration is seen both beneath and above the syncytium in scattered areas. In a few places, the syncytium is heaped up. The connective tissue of the chorion is better preserved toward the epithelial surface than it is toward the amnion, the tissue in the former area being denser and more fibrillated. Towards the amnion there is marked degeneration. Distributed through the connective tissue are a few irregular masses of syncytial cells. Separating the chorion from the amnion is a homogeneous layer of connective tissue almost equal in thickness to the amnion.

The epithelial layer of the *amnion* is practically intact and only slightly festooned. It consists almost entirely of cubical cells which are very granular. The nuclei are very well preserved, but the cell outlines are difficult to distinguish. The connective tissue of the amnion presents a dense, homogeneous appearance.

UMBILICAL CORD

A cross-section of the cord is elliptical in shape. The amniotic epithelium which is found in normal cords, is entirely missing in this specimen. The periphery of the cord consists of a deeply staining, granular, necrotic layer of tissue. This merges into the stroma (Wharton's jelly), which exhibits marked degeneration and stains poorly. Stellate cells are seen everywhere but are extremely degenerated. The tissue retains its concentric arrangement at the periphery and around the blood vessels. The latter, while readily distinguishable, are poorly preserved. The vein has col-

lapsed and its lumen contains degenerated blood cells among which are many small round cells. The arteries have likewise collapsed, their musculature is degenerated and poorly stained, and they contain degenerated blood cells within their lumina. A small slit-like extension of the cœlomic cavity of the fetus is visible in the sections from the fetal end of the cord. No remains of the omphalomesenteric vessels or the yolk stalk are discernible.

SUMMARY

The features which are of special interest in this case may be briefly summarized as follows:

The discrepancy between the estimated age and the menstrual age would indicate that the fetus had been retained in utero for twenty weeks after the cessation of development. In spite of this long retention, there was no evidence of infection in the fetus or in its membranes. The most marked change was that of maceration of the fetus with absorption of its fluids and mummification of its tissues. Of all the tissues the central nervous system was most profoundly affected; the least affected were the bones and cartilages; next in order of preservation was the voluntary musculature and the fibrous tissues. Although considerably degenerated, the essential architecture can still be recognized in the liver, spleen, pancreas, adrenals, stomach, lungs and heart.

The fetal structures of the placenta show evidence of advanced degeneration, but not so marked as that of the fetus itself. The maternal portion of the placenta and the implantation site do not differ materially from those found in the normal placenta at this stage of development. We have therefore no indication in this case that the death of the fetus was due to any defect of the environment. The cause of death is more likely to be found in the fetus itself, and the case may represent one of defective germ plasm.

BIBLIOGRAPHY

(1) Mall: On the Frequency of Localized Anomalies in Human Embryos and Infants at Birth, Am. Jour. Anatomy, July, 1917, xxii, No. 1. (2) Mall: On the Age of Human Embryos, Am. Jour. Anatomy, March, 1918, xxiii, No. 2. (3) Meyer: Uterine, Tubal and Ovarian Lysis and Resorption of Conceptuses. Biolog. Bull., 1919, a., xxxvi, p. 283. (4) Meyer: On the Nature, Occurrence and Identity of the Plasma Cells of Hofbauer, Jour. Morpho., June, 1919, b., xxxii, No. 2. (5) Streeter: Weight, Sitting Height, Head Size, Foot Length and Menstrual Age of the Human Embryo. Contributions to Embryology, xi, Carnegie Institute of Washington, Pub. No. 274, 1920.

Society Transactions

THE NEW YORK OBSTETRICAL SOCIETY. MEETING OF FEBRUARY 8, 1921

THE PRESIDENT, DR. FRANK R. OASTLER, IN THE CHAIR

DR. J. W. WARNER presented a report of a case of **Fatal Rupture of a Gonorrheal Pyosalpinx.**

Mrs. M. W., age thirty-six, married five years, never pregnant. She menstruated every twenty-eight days, flowing 3 to 4 days, the amount was very moderate and there was never any pain. She was last unwell 6 weeks before her present illness, being two weeks' overdue, an irregularity which she had never experienced before. There had not been any leucorrhea, pain or any suggestion of previous pelvic inflammation.

Three days before I saw her she began to have pain in the right lower quadrant, with temperature of 100° and pulse 90. There was no vomiting or diarrhea. Some form of medication was given and in 24 hours she felt much better and continued so for another day. In the late afternoon of the third day, the pain became excruciating and was attended by vomiting and profuse bleeding from the uterus. When I saw her three hours later, the temperature was 102.5°, pulse 120 and of good quality, respiration 20. The abdomen was very rigid. A very tender mass, the size of a fist, could be distinctly felt in the right vaginal fornix. The history and clinical picture seemed to point to a ruptured ectopic gestation and operation was advised.

Upon her arrival at the hospital two hours later her temperature was 104°, with a pulse of 124, still of good quality. The white blood count was 17,800 with 92 per cent polynuclears.

Upon opening the abdomen, pus and free fluid immediately appeared. The right appendage was one abscess cavity and ruptured. The appendix was adherent to the pelvic mass and its peritoneum was acutely congested. The appendage was removed and also the appendix. As the patient's condition had become much worse, it seemed unwise to extend the time by draining through vaginal fornix and cigarette drains were used through the abdominal wound. The day after operation the temperature rose to 106.4° and she died in forty-eight hours. At the time of operation a culture was taken from the thick yellow pus, which exuded from the tube near the uterine end of the rupture and also from the free fluid. A week later the bacteriologist reported a pure growth of gonococcus. No other organism was isolated from the culture.

DISCUSSION

DR. H. N. VINEBERG.—I want to correct the impression which I evidently conveyed to Dr. Warner at the last meeting. What I said was that I had seen cases with a temperature above 101°, even as high as 103°, in ectopic, with nothing but blood in the peritoneal cavity,—no peritonitis.

In reference to this case I would say that within my experience I have seen two or three cases in women who died very rapidly, within twenty-four hours, after

rupture of an unsuspected pyosalpinx. These were women between 40 and 50 years of age, in whom there had been absolutely no pelvic history prior to the tragedy that occurred. They were suddenly seized with pain in the abdomen, and became distended, and in one case, in which no operation was done, the patient died within twenty-four hours. I had seen her in consultation. The other was practically a hopeless case. I have seen two or three of those cases in women rather advanced in years with absolutely no history prior to the attack which proved fatal.

DR. W. M. FORD.—Two years ago I was called to see a woman married about six months. She gave a typical history of a ruptured ectopic; as typical as any I have ever seen. In addition I found a mass on the right side and slight flowing. She was brought to New York with a great deal of suffering and was operated on at the Woman's Hospital. We found a rupture about the center of the tube but no ectopic and the infection was apparently of very recent date in her; though her husband gave a history of having had a gonorrhea six or seven years before, which he assumed had been entirely cured, and, in fact, had been pronounced cured, before he married.

An interesting point in this case which I wish to compare with Dr. Warner's case is the condition of the fimbriated extremity of the tube. In my case the tube was widely open and was exuding a rich creamy pus. Dr. Lawrence W. Strong cultured the pus and isolated a pure strain of gonococci.

The patient's symptoms indicated that rupture of the tube had taken place before I was summoned from New York, so that well over 24 hours had elapsed before she was operated upon. There was nothing to do but to take out the tube. She made a very smooth recovery.

In Dr. Warner's case, may I ask, was the fimbriated extremity of the tube open and was it bathed in pus?

DR. W. P. HEALY.—According to the literature, rupture of an acute pyosalpinx is a very unusual occurrence, because apparently up to a few years ago (about 1912) less than 30 cases had been recorded. It seems to me, from the discussion this evening, there are more cases occurring than are being reported. These cases, as Dr. Warner and Dr. Vineberg emphasized, are usually fatal cases. Only about 50 per cent of the cases reported recovered, and that 50 per cent of recoveries was only in cases operated on very promptly and very early.

DR. C. G. CHILD, JR.—It seems to me that one of the most interesting points in these cases is the etiology of the rupture. It is hard for me to imagine that pus tubes, growing as slowly as they do, will distend sufficiently to rupture spontaneously, unless there is some traumatic factor in the case. Neither of the reporters mentioned or even suggested the possibility of any traumatism in these two cases. I have never seen a spontaneous rupture of a pus tube except where there was trauma associated with it. I have never seen but one rupture, and that was in a case of tubo-ovarian abscess where a woman was struck in the abdomen by the pole of a wagon as she stood in front of it, which ruptured a large tubo-ovarian abscess and gave her a general peritonitis, from which she died. If these cases rupture spontaneously by distention of the fluid which they contain, of course that is an argument for early operation and not for delay.

DR. F. R. OASTLER.—In the last two years I have had two such cases in which there was no traumatism and they ruptured in exactly the same way as an appendix where there was consequent and progressive peritonitis. There was no traumatism in either case. The discussion tonight, however, was on gonorrheal rupture, not on general rupture due to infection from other microorganisms.

DR. J. W. WARNER.—I would like to briefly answer Dr. Ford's question in regard to the fimbriated extremity of the tube. There was no fimbriated extremity. It

was just one big abscess cavity, apparently an old one, in which the organisms had taken on new life. They were very active. This apparently was a very fulminating affair. Every means was used to determine whether there was any other organism in this case, but the only one cultured was a gonococcus.

DR. H. N. VINEBERG.—I would like to ask Dr. Ford whether there was a free discharge of pus from the fimbriated end and still the tube ruptured. We have all seen cases in which we happened to make a mistake and pus exuded from the tube in salpingitis, but that would not constitute a rupture.

DR. W. M. FORD.—In order to make myself clear I will state that when I put my hand into the abdomen I was fully confident that I would roll out a partly ruptured ectopic. As I delivered the right tube, I found, about its center, on the side away from its peritoneal attachment to the broad ligament, a perforation about one-fourth inch or less in diameter. There was comparatively little pus. There was some serum in the pelvis, but not very much. At the distal end of the tube there were no adhesions, that is, none that were appreciable. There may have been some trivial flakes of fibrin which I separated unconsciously. The fimbriated end of the tube at first glance appeared perfectly normal, but when the rich creamy pus which filled the fimbriated end was gently wiped away, its mucous surface was found engorged and congested. The other opening, (the rupture) was quite independent. We thought at first it perhaps was a supplementary aperture in the tube. Dr. Strong said it was not and further reported that he did not find gonococci. It was two or three days later when he reported that he found gonococci present. The pus was otherwise sterile.

DR. ARTHUR MORSE, of New Haven (by invitation) read a paper entitled **The Significance of the Bony Outlet in Perineal Lacerations, Cystocele, and Prolapse.** (For original article, see p. 159.)

DISCUSSION

DR. W. E. STUDDIFORD.—I am in accord with Dr. Morse's description of the lacerations that occur in the funnel pelvis. I am not quite sure that I am in accord with his statement that the type of repair will depend largely on the symptoms the woman presented at the time the repair was made, that it might have to be more extensive than simply a slight building up of the pelvic floor.

Now, the question of the injuries to the anterior wall: There is one other feature of the pelvis to which I think Dr. Morse should have called attention or should have noted in his preoperative histories and also in the question of a prenatal consideration of the case, and that is the inclination of the pelvis. I think as we analyze our cases of prolapse of the anterior wall, those with cystocele of greater or less extent, they are very apt to fall into two classes. There is one type of the rather thin woman with poor fascial development all over the body, poor fascial supports in the pelvic floor and poor fascial supports to the bladder and the uterus. She may or may not have a difficult labor, may or may not have appreciable injuries to the pelvic floor, but she is very apt, subsequent to her labor, to develop relaxation of the pelvic floor with more or less cystocele.

A second type of case, and one in which cystocele seems to be most common, is the short, fat woman, with a pelvis that is often normal in its measurements, but with a very bad inclination, large hips and narrow waist. In the course of her labor the progress of the second stage is usually accompanied by a projection of the anterior lip, and the bladder is often rolled out long before the head gets down to the pelvic floor. In that type of case it has seemed to me the pubic arch may be

somewhat narrowed, or it may be normal, but the factor in that case is the attachment of the fascia that supports the anterior wall. The two bony supports of that fascia are directly behind the symphysis and the spine of the ischium. The remainder of the bony attachment to the white line is more or less movable and subject to pressure in either direction, and in those cases we very often find that the spine of the ischium is at a deeper level. The inclination of the fascia that supports the anterior wall is very different from that in the ordinary, normal case, and consequently during the second stage the advance of the presenting part drives it into the anterior wall. The break comes behind the head when it reaches the pelvic floor. The inclination and the general build of the pelvis has more to do with cystocele conditions and prolapse of the anterior wall than the pubic arch. The deformity resides in the narrowing of the arch, the anterior wall is pulled upward and the pressure comes against the pelvic floor; consequently the deep lacerations. Anterior tears are unusual. The head never comes in the anterior portion of the pelvis sufficiently to tear the supports to the bladder. So in figuring on the causes of cystocele a consideration of the inclination of the pelvis is quite as important as the measurements of the outlet.

DR. FRANKLIN A. DORMAN.—I feel a little dissatisfaction with Dr. Morse's theory of the production of the cystocele. I think Dr. Studdiford has expressed more accurately the separation of the fascial attachment, in describing it as an earlier affair than at the time of the extension of the head. It does not seem to me that the overextension of the head in forceps would be a factor. The natural wide arch is a saving thing as far as the perineum is concerned, and I cannot see why of necessity it should be a cause for the weakening of the fascia of the anterior wall. I do believe, however, that where the forceps come in as factors in the cystocele is in the sense that they attack the head, or advance the head, in a high median position and actually cause further trauma to the anterior wall in the way Dr. Studdiford has said. Certainly many forceps operations do produce cystocele, but many of them are applied before the cervix is completely dilated, or where there is an edematous anterior lip and where the traction has been exerted in the wrong direction; but a properly applied forceps in a head that is low down, coming out by extension under the arch, would be a safeguard.

I am in thorough accord with what Dr. Morse says about the narrow arch. I believe we should be much more on the alert to recognize the funnel pelvis, and that it is a relatively common deformity. The true obstetrician instinctively, if he does not measure every case, feels with his fist for the width of the arch. If I find there is no material space when feeling with my hand, by examining the woman with pressure against the perineum, I immediately proceed to measurements to ascertain exactly how limited it is.

I am glad Dr. Morse called attention to the inevitability of laceration. I have delivered cases, not so many of them, where I felt I achieved something even though I delivered the baby through the rectum because the head was low down (those are not cases for cesarean section) and the only space I had was in that direction. If the baby is of large size with a deformity of that sort, a man may well consider the necessity of a cesarean section. Furthermore, if the patient has had a number of serious deliveries and has had a successful repair, rather than face the high destruction of the secondary perineal repair, a selective abdominal cesarean may be proper to save the utter ruin that would follow a subsequent delivery.

DR. JOSEPH BRETTAUER.—I do not want to detract in the least from the importance of the pelvic outlet measurements as described by him. Like Dr. Studdiford, however, I feel that I would lay more stress on the inclination of the pelvis, in the consideration of the etiology of cystocele and prolapse. Of the very large number of patients observed, I cannot at this moment remember a single instance of cysto-

cele or prolapse accompanying a deep laceration of the perineum, in a woman with a steep pelvis (over 60 degrees); on the other hand, in a woman with a normal pelvic inclination, in whom the perineum was deeply lacerated, I cannot recall a case which was not accompanied by prolapse of one or both vaginal walls.

DR. O. P. HUMPSTONE.—I think the presence of an occipitoposterior position in a funnel pelvis spells as much damage to the bladder at the beginning of the second stage as it does to the perineum at the end of the second stage of labor.

DR. HAROLD BAILEY.—I have always taken a great deal of interest in the funnel pelvis since Williams popularized this work and drew our attention to Klein's early paper. We, also, check up every tear that occurs on the service, from the standpoint of the transverse measurement of the outlet. If the tear is in the hands of an intern, before criticising him we remeasure the outlet, and in almost every tear there is a narrowing of this transverse diameter, as the doctor stated. We, however, have always taught our students that in order to save the perineum, the head must be kept in extension high under the pubic arch. I firmly believe that that is not a mistake; that is to say, I believe it limits the trauma not only to the perineum, but also to the vaginal walls as well.

Now, if we accept the doctor's figures without further confirmation, we will certainly, as Dr. Brettauer said, have to accept Dr. Pomeroy's median perineotomy as the correct way for delivery, not only it seems to me in the narrowed outlet, but in the normal pelvis. It has struck me that in those cases of Dr. Pomeroy's which I have seen, there has been practically no dropping down of the anterior wall, even though some of the perineums could not be considered normal. So it seems to me that there is something in our experience which more or less substantiates Dr. Morse's figures. However, as I have not taken any series of measurements in these tears I cannot confirm them.

DR. ASA B. DAVIS.—It has been my experience, that a good deal of the destructive tearing that occurs in delivery of these cases of funnel pelvis starts higher up than in the pelvis, before the head reaches the outlet. For instance, in many of the forceps cases the vagina is rolled down and drawn across the ischial spine and the tear is started by the forceps cutting the vagina. There is actually bursting of the vagina, and I think that very often when repairs are done that is not taken into account.

DR. ARTHUR MORSE (in closing).—In this study, I did not consider the point Dr. Studdiford brought up. However, I think that this is one which needs investigation, so I am grateful to Dr. Studdiford and to Dr. Brettauer for suggesting it.

I attempted to find published statistics regarding the diameters of the pelvis in cases of cystocele and prolapse and perineal laceration, but I have not found any; and in reply to Dr. Dickinson's question, I am under the impression that there are no figures of that sort in Halban and Tandler.

If we were to consider the funnel pelvis purely from the standpoint of obstetrics, it would be interesting to present diagrams showing an even greater contraction of the outlet than that which I indicated. Under such circumstances one may have a bituberal diameter of 5.5 cm. and a spontaneous delivery. On the other hand, one may have a diameter of 7.5 cm. and dystocia. In the first instance, the lengthening of the posterior sagittal compensates for the shortening of the bituberal diameter, while in the latter case it does not.

Dr. Dorman gave me a very good text which I might speak upon for a long time, namely, the combination in the paper of a subject which has to do not only with obstetrics but also with gynecology. That was intentional. I think that men doing obstetrics ought also to know gynecology and that men doing gynecology should know obstetrics, and in this paper I purposely made an attempt to join the two subjects in order not to give you just one side.

Unfortunately, I cannot answer Dr. Humpstone's question. That is due to the fact that I was unable to determine the character of the previous labors. However, I agree with Dr. Humpstone that an occiput posterior in a funnel pelvis is a difficult problem with which to deal.

I may say also that I think Dr. Studdiford is quite right when he speaks of the perineal repair. I did not mean that one should not do a repair simply because the pelvis was of the funnel type, but I wished to point out that in an outlet of that sort if one does an extensive repair, one must look forward to the breaking down of the repaired structures at a subsequent labor.

NEW YORK ACADEMY OF MEDICINE
SECTION ON OBSTETRICS AND GYNECOLOGY.
STATED MEETING, HELD MARCH 22, 1921.

DR. CHARLES G. CHILD, IN THE CHAIR.

DR. WILLIAM P. HEALY presented a report on **Postoperative Tetany Due to Sodium Bicarbonate.** (For original article, see p. 164.)

DISCUSSION

DR. ROLPH FLOYD.—There is very little to add to Dr. Healy's report because the autopsies showed practically nothing. Autopsy was performed on cases I and IV with essentially negative results. The usual evidences of infection were notably absent. There were slight evidences of degeneration in the renal epithelium but inasmuch as these autopsies were not performed early enough to judge whether or not these changes were postmortem, they cannot be considered of much significance.

The only other lesions present were as follows: There was some irritation of the retal mucosa and infiltration of the submucosa with round cells and a few pus cells and some swelling from the exudation of serum. In both cases the appendix had been removed and there was a little traumatic scarring of the caput coli due to the operation and of no significance. In Case IV a lesion of significance was multiple focal necrosis in the liver, where the hepatic cells were somewhat degenerated, but had not entirely lost their staining power, and a limited infiltration with a few pus cells. Outside of this practically nothing was found in either case in any way related to the death of these patients.

DR. ISIDOR GREENWALD.—It seems to me that anyone who looks over the histories of these cases will agree that the administration of sodium bicarbonate was responsible for the tetany. It is merely a question of the mechanism by which it acted.

Tileston reported a case in which tetany was produced by the intravenous injection of 5 per cent sodium bicarbonate, Harrop had a similar result in a case of mercurial poisoning and Howland and Marriott observed several cases in children.

The symptoms observed, particularly in the cases under discussion, resemble those reported in fatal cases of sodium chloride poisoning.

Sodium bicarbonate acts in three ways: First, it is an alkali and may cause "alkalosis"; secondly, it is a salt and causes changes in osmotic pressure, and, thirdly, it would seem that it should produce a disturbance in the balance of sodium and calcium and other ions.

In only one of these cases was the carbon dioxide capacity of the plasma determined and in that it was 85 per cent, far above the normal. What the change in actual reaction may have been is not known.

In regard to the action of other sodium salts:—sodium chloride, sodium sulphate,

and sodium phosphate. Sodium chloride produces a disturbance in which the neuromuscular symptoms are most conspicuous; with sodium phosphate these are much less marked. In giving sodium bicarbonate, one of the most common results is respiratory failure. Tetany may be absent.

Changes in osmotic pressure probably have something to do with the symptoms observed after injecting hypertonic solutions of sodium salts, the symptoms resembling those obtained with hypertonic glucose solutions.

But there seems to me to be no question but that some of the symptoms are due to the disturbance in the balance between the calcium and sodium ions in the blood.

DR. HARRY VAN NESS SPAULDING read a paper entitled **Papillary-Cystadenoma of the Ovary.**

This paper was collaborated with Dr. John F. Erdmann and the statistics and case records were taken from the records of the Post-Graduate Hospital.

In a review of 5,000 consecutive pathologic sections of the Pathological Department of the Post-Graduate Medical School and Hospital, cystic disease of the ovary constituted 200, or 4 per cent, and of the 200, 36 or 18 per cent were papillary. A review of the observations of others shows that the frequency varies from 10 to 27.4 per cent of all ovarian cysts. In addition the records of 13 private patients of Dr. Erdmann's operated upon elsewhere than at the Post-Graduate Hospital and three from the writer's cases, are incorporated in this paper, the observations therefore being drawn from 52 cases. A large number of cases (11 in this series) of papillary cystadenoma occur in patients under the age of 30 years.

A review of a series of papillary sections impresses one with two facts: (1) The very gradual transition, with no sharp line of distinction or classification from the benign to the premalignant, and to the typically carcinomatous picture; and (2) that a simple, apparently benign papillary area may exist in the same section with a complex or malignant field, from which clinically one can only conclude that there is no clinical method whereby the degree of malignancy can be determined except by the microscope. The last word is therefore that of the pathologist. Microscopic examination in the present series indicates that 33 per cent were benign; 16.6 per cent premalignant, and 50 per cent malignant; 22.2 per cent were bilateral and 13.8 per cent multilocular. Therefore out of the 200 cases of all types of ovarian tumors, 12 per cent were malignant or premalignant papillomas. Other observers have shown a higher percentage of malignancy. Every warty or papillary intracystic deposit and every secondary cyst, however small, should be sectioned for malignancy. These tumors show a strong tendency to bilateralism and general metastases is not rare. Bilateralism, especially as related to the solid form of ovarian tumors, usually indicates a carcinomatous process elsewhere in the body. All bilateral ovarian tumors demand a careful examination of the abdominal viscera and breasts.

The prognosis is variable. However, one must bear in mind that the papilla *per se* as implanted upon or invading the surrounding tissues or organs is never, in the true clinical acceptance of the word, benign. On the other hand it rarely shows the rapid progress of neoplasms associated with other glandular or structural tissues. Of the series of cases at the Post-Graduate Hospital 66.6 per cent were malignant or potentially so. Many of the patients are prone to live a variable number of years after operation, and have been operated upon from two to five times in a period of ten years. Certain conclusions with reference to prognosis can be drawn: When a cyst is removed intact without peritoneal contamination, it loses its prognostic interest, however malignant the pathologist may report it later; there is always that indeterminate personal equation which cannot be solved by the prognoses in other cases; prognosis as to recurrence improves with the age of incidence; in a certain number of cases where rupture has occurred and the per-

itoneum is abundantly studded with warts, ovariotomy has proved a sufficient therapeutic measure to cause a regression of the remaining irremovable peritoneal deposits. We feel that this is quite exceptional and while such patients may linger for a number of years, yet they will finally succumb to the toxic exhaustion of the malignant peritonitis. We consider papillary ovarian tumors as potentially malignant and that if ruptured they usually eventuate in malignancy. In adenocarcinoma recurrence is probable and mortality high.

Every ovarian cyst must be removed intact by abdominal section as soon as discovered. If unilateral oophorectomy is performed, the patient should be periodically examined. Careless or rough handling, resulting in intraabdominal rupture, tapping to reduce the size of the tumor, and the vaginal approach cannot be too strongly condemned.

Radium should be employed in cases in which the ovaries or the peritoneal implants could not be surgically removed.

DISCUSSION

DR. WILLIAM P. HEALY.—I should like to emphasize a point brought out in citing one of the cases. Sometimes one comes across a case of this type of papillary cystadenoma in which the condition is apparently inoperable; a celiotomy is done and one reaches the conclusion that it would be unwise to remove the mass or even a part of it, and the abdomen is closed. I had such an experience some years ago and I have had the patient remain under my observation. She had a papillary cystadenoma of the left ovary, filling the whole left side of the abdomen and entirely inoperable. After the operation the fluid accumulated much more slowly than before and a year later bimanual examination led me to believe that, while the tumor mass was much more extensive than at the time of the exploratory laparotomy, it was of a type suggesting the possibility of removal. I did an exploratory laparotomy and found it possible to remove the tumor. I did a complete abdominal hysterectomy and the patient survived and has remained well. There remained, however, numerous small wart-like excrescences on the bowel and parietal peritoneum which subsequently regressed after the removal of the greater portion of the tumor mass. So we must bear in mind that papillary cyst adenocarcinoma is something a little different from what we are accustomed to understand as cancer.

DR. CHARLES G. CHILD.—In speaking of the removal of these tumors Dr. Spaulding brought out the point that the incision should be large enough to permit the removal of the tumor without any attempt at aspiration or the purpose of reducing the size of the tumor. That is a most valuable point. In the operative treatment of all ovarian cysts one can never tell whether they are papillomatous or not, and it is advisable not to run any chance of scattering a malignant growth. It is a distinct mistake to tap a cyst before attempting to remove it through the incision. If one finds that there has already been a spontaneous rupture of one of these cysts one can be almost sure that it is a malignant papillary cyst adenoma and that there is little use trying to remove it. When a cyst has reached the stage of spontaneous rupture I have no confidence of effecting a permanent cure by its removal.

I had a case in a girl nineteen years of age who gave no symptoms except of a benign tumor on the left side. The right ovary appeared absolutely normal. The tumor on the left side was removed. Nine months later the girl returned and a tumor six inches in diameter was found on the right side. Both of these tumors were benign. The microscopical examination is sometimes uncertain because in borderline cases it is difficult for the pathologist to distinguish benign and malignant conditions.

I recall a case of bilateral ovarian tumors in which the tumors were the size of a grapefruit. The abdomen was opened and the condition seemed apparently

hopeless. There being numerous peritoneal transplants present, I had to be satisfied with the removal of a few transplants for examination. There was already a considerable accumulation of fluid in the abdomen. Two pathologists reported a benign growth and one that it was malignant. Following this a radical removal was done after which the patient improved rapidly. It is now ten years since she was operated upon and she is today alive and well and shows no symptoms of recurrence.

I had another patient who was operated upon eight years ago, now dying. When she was operated upon eight years ago she had a double salpingitis and adherent ovaries. On opening the abdomen it was found that the right ovary was cystic and adherent and it was thought best to remove it. After this the patient was perfectly well. Seven years later she began to suffer with pelvic pain and distress and was found to have a left ovarian cyst eight inches in diameter. The only symptoms were those due to pressure on the rectum and a periodical leucorrhea which was very profuse. This discharge was examined and the report came back uncertain. It was noticed that after one of these flooding periods the tumor decreased in size, and a diagnosis was made of a connection between the cyst and the uterine cavity. The abdomen was opened and found filled with peritoneal transplants, which had invaded every structure. During the past week, in order to relieve an intestinal block caused by these growths, a colostomy was performed, showing secondary involvement of all viscera, the omentum and the intestinal walls.

In operating on a papillary cystadenoma, if one is going to be satisfied with removing a single ovary, the other ovary should be kept under observation and if it shows any signs of enlarging it should be at once removed.

DR. LEROY BROUN.—I was interested in the Doctor's statement that one of five ovarian tumors was papillomatous; I thought the ratio was one to four or one to three. I am glad to be corrected. Did those include only your own collected cases, or were Kelly's cases included?

DR. SPAULDING.—Yes, Kelly's cases were included.

DR. BROUN.—The importance of this subject was brought out by Kelly twenty-five years ago when he stated that all ovarian cysts should be regarded as malignant until proved otherwise, which could only be done by removal.

I cannot agree with Dr. Spaulding and Dr. Childs as to the necessity of the large incision, extending sometimes to the ensiform. A tumor can be aspirated without scattering transplants if one uses a small needle under proper precautions. At the Woman's Hospital in the case of a good sized tumor that would necessitate an incision much beyond the umbilicus in order to remove it intact, we make a liberal incision to the umbilicus and expose the tumor. We then aspirate with a small needle fitted on to the rapid aspirating exhaust. In doing this the cyst wall is caught up on each side of the needle as soon as it becomes sufficiently flaccid to get a grasp. The cyst wall is in this way steadily drawn out of the abdominal cavity as it becomes more flaccid. By bringing down the size of the tumor one can separate its adhesions to the adjacent organs outside of the abdominal cavity, and as a result we feel that we run less risk of rupturing the thinner portions of the wall of the cyst and scattering its contents. The patient is also saved the very large incision which is undesirable if the same results can be accomplished without it. The large incision, while formerly much in vogue, has been practically abandoned in favor of aspiration with a small needle which with the precautions cited has been most satisfactory in our hands.

DR. SPAULDING, in closing.—Although I have the highest respect for Dr. Broun's opinion, in view of his very large experience, nevertheless I feel that there is no mechanical method of tapping an ovarian cyst, regardless of how carefully the technic is carried out, that is not accompanied by some leakage. Personally, I have never seen a case tapped where there was not some amount of peritoneal con-

tamination. Large cysts are usually pseudomucinous, but occasionally, we find in them papillomatous implants and in tapping one may therefore do harm. Furthermore, with the use of a small needle it requires a long time to evacuate a large cyst and at times the cyst contents are so gelatinous that they will not readily pass through the needle; or the cyst may be multilocular and several attempts must be made to evacuate the various loculi.

Most of these cysts are adherent and it takes a large incision to deliver them, in toto, but the length of the incision is a minor consideration compared with the success of the operation. It is an honest difference of opinion I have with Dr. Broun, but I strongly feel that the patient is much better off if these cysts are dealt with in a way which will not contaminate the abdomen, namely, a sufficiently long incision to secure its delivery intact if possible, without tapping.

DR. S. J. SCADRON read a paper entitled **Episiotomy in Primiparous Labors.**

Dr. Seadron called attention to the impossibility of predicting the amount of damage to fascial and muscular structures by the descent of the head in the second stage of labor. Although a fairly large percentage of primiparae undergo normal labor with absolutely no injury to the vaginal tube, lacerations of the lower birth canal in his personal experiences as well as in the service of the Jewish Maternity Hospital showed that this injury occurs in about 45 per cent of all primiparous labors and in about 10 per cent of multiparous births. One of the important factors which underlie damage to the supporting structures of the bladder is the pressure which follows voluntary efforts at expulsion. As the head descends, the anterior vaginal wall is pushed down in front of it and sometimes becomes caught between the advancing head and the symphysis. A timely median incision anterior to the sphincter would, according to the speaker, prevent the overstretching or tearing of the urogenital structures and the bladder attachments. The perineal structures are likewise subjected to laceration as the head descends further and either a central or lateral incision will save the perineum in such cases. Dr. Seadron stated that there were other indications for episiotomy besides the prevention of cystocele and rectocele and claimed that it competes with low forceps, as after the incision is made the head can be easily expressed with gentle hand pressure from above. Prolonged delay of the perineal stage with threatening asphyxia of the child must also be considered, especially in elderly primiparae with rigidity of the perineum. In breech extraction episiotomy should also be performed as a prophylactic measure, the perineum being incised before the breech is delivered, which renders it more easily possible to bring down an unexpected extended arm and an easier delivery of the aftercoming head. In edema and other inflammatory conditions of the vulva it is also advisable to make an incision. Dr. Seadron advises cutting the perineum with a straight and blunt-pointed scissors, using the finger as a guard in the vagina. The incision should extend about one inch to one and one-half inches on the skin surface of the perineum and may be extended further if necessary. In lateral episiotomy the incision is made through the skin and subcutaneous tissues, the length of the same being gauged by the presenting part. For the repair of episiotomy wounds the speaker recommends chromic or plain catgut, preferring the latter. A median incision is followed by better union and lateral episiotomy should therefore be performed only in case of persistent occipitoposterior positions, especially when attempts at rotation are made with forceps. Dr. Seadron also prefers the lateral incision in breech extractions in primiparae.

DISCUSSION

DR. FREDERICK C. HOLDEN.—I am always glad to hear another paper on episiotomy, the idea being that the more papers we have on the subject, the more

likelihood that those still opposed to the operation may come over to the idea that there may be something in it. I am surprised at the number of men still opposed to this procedure, and I cannot understand their attitude, or see why they hesitate to do it. I use it in about 90 per cent of my primiparous patients. The results are excellent though I do not think that it always prevents cystocele. One frequent mistake is that it is not done soon enough. I use a knife instead of shears. The distance between the vulva and rectum varies in different individuals, and in some there is very little space to cut. I think that if we hammer away at this subject, men will come to recognize that episiotomy really does help and that the patients in whom it is used do not come back with a relaxed vagina.

DR. HERVEY C. WILLIAMSON.—I cannot see how a median episiotomy is going to prevent a cystocele, as it is not done, as I see it, until the head is on the perineum, and if there is going to be a cystocele the damage has occurred before the episiotomy is performed.

I have never heard what happens in subsequent deliveries, when there has been a tear into the rectum. Do you perform median episiotomy a second time, and are they successful?

I have always preferred the lateral episiotomy.

DR. CHILD.—Dr. Scadron's paper gives very well the indications for episiotomy, and with certain minor details I agree with him fully.

In regard to median episiotomy saving the bladder supports I do not agree, but I think Dr. Scadron said "might probably save," so there is no occasion for criticism on that point. The bladder supports have of course been interfered with long before the head reaches the perineum, if the bladder is distended, which seldom happens today in a properly conducted labor.

I have practiced episiotomy for many years, ever since I studied in the Rotunda Hospital of Dublin, but I have always used the lateral incision. I never could see any reason for injecting median episiotomy into the question. At this stage of labor our main thought is to prevent a solution of continuity of the tissues between the vulva and the rectum and yet with median episiotomy is produced the very condition that we wish to avoid. We do not so much fear a lateral tear even if it extends up to the broad ligament, but we do fear a tear into the sphincter and this happens very frequently with median episiotomy. It is furthermore in a very unsurgical location so far as drainage is concerned. The median line is directly in the line of all lochial discharges, and is especially liable to infection if the incision is closed with catgut. On the other hand, the lateral incision is well up out of the area of lochial drainage. I believe one gets a higher percentage of primary unions with the lateral than with the median episiotomy. I believe also that nonabsorbable suture material gives better results than absorbable. In operations about the vagina I always use silkworm gut.

The proper time to make the incision Dr. Scadron did not dilate upon. There should be a thorough inspection of the vagina between pains as the head descends and as soon as one sees that the limit of stretching has been reached and that little tears are beginning to appear in the vagina or fourchette then is the time to make the cut but only through one levator ani muscle. This does not separate the transverse fibres of the levator ani muscle as the median incision does.

DR. SCADRON.—In many of my cases that present themselves 8 to 10 weeks' postpartum I find that on examination I cannot recognize any scar tissue, and have to refer to my history cards to find out whether or not the patient has had an episiotomy, thus showing that there is very little cicatricial tissue with median episiotomy in a large percentage of cases, especially when the repair is made layer by layer

Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

Collective Review

The Views of Primitive Peoples Concerning the Process of Labor*

BY JONATHAN WRIGHT, M.D., PLEASANTVILLE, N. Y.

THE most profuse notes to be gathered from the literature of the medicine of primitive man have to do with childbirth. There is probably no one assertion made in regard to him, which is so well known to the generality of civilized people as that which declares he is brought into the world with infinitely less of the travail of maternal suffering and with less of the pomp and circumstance that attends the arrival of an heir to our present first families. A careful examination of the testimony establishes much reason to believe that this is true, especially as to the pain suffered by the parturient woman. The impression to be gathered is that this belief has arisen fundamentally from phenomena exhibited by the primitive mother dependent upon her psychology and environment, and upon the general attitude of primitive man towards pain. There can be no doubt that close contact with a nature whose processes are governed by laws unmodified by the culture of civilized man, which to some extent has abolished avoidable physical pain, but to a larger extent has rendered man more susceptible to unavoidable physical suffering, lies at the bottom of this difference, but it is not everywhere apparent. However, it will be well to mention first the testimony which exhibits the childbearing woman in low social cultures as apparently standing in no pressing need of the luxuries of chloroform and "twilight sleep." However that may be even in the reindeer period of culture in Europe there was a need felt by parturient women for help at the time of childbearing. Upon a reindeer bone Piette has discovered a scene delineated which is called the "Rite of the stride over the pregnant woman."[25] A male reindeer is standing over the prostrate form of a woman in labor lending her strength and efficiency in the bearing of a child by his presence. The soul of the reindeer we may find, quoted by Mr. Fiske[26] from Tylor apparently, as being decoyed into a sick Lapp or Chukchee to act as a tonic for his recovery and in this picture we see that useful animal again exerting his beneficial powers.

Williams[27] in 1858 said of the Fijian women that generally they suffer little in parturition. The Tongan mother on the birth of the child gets up directly and bathes in some pond or river and on her return eats freely of food, but the Fijians profess to keep to the house

*See Review of Literature on Menstruation in this Journal, January, 1921, on Conception and Puerperium, May, 1921.

a few days and some lie at their ease a full month. The Australian black women are pounded and speared and cut and knocked and abused, until no doubt the bearing of a child or two is a mere drop in the bucket of their miseries which they make light of. Among the cannibals of Australia "the birth of a child does not seem to give the mother much trouble. She goes a short distance from the camp, together with an old woman, and when the interesting event has taken place and the child has been washed in the brook, she returns as if nothing had happened, and no one takes the slightest notice of the occurrence."[28] Curr[29] in his résumé of the accounts of the Australian races says: "Aboriginal women generally suffer less, on the whole, during parturition than white women do. I attribute this to their bodies being allowed to develop in childhood without the restraints and injuries which result from the use of stays, corsets, and other civilized appliances." Roth[30] quoting from Davies says of the Aborigines of Tasmania: "When a woman was taken in labor, the tribe did not wait for her, but left her behind with another woman and she afterwards followed as best she could." In the Andaman Islands "no instances of difficult delivery are known"[31] and they rarely suffer much. In New Guinea "the pregnant woman works in the fields until the beginning of the labor pains."[32] Sometimes the woman stays a month in the hut after childbirth. "I have seen one of them walking around with her new-born child two days after delivery." Among the Malays "delivery, as a rule, was attended by very little difficulty, the woman usually resuming the ordinary avocations after three or four days' seclusion."[33] Brown[34] speaks of delivery among the Melanesians and Polynesians as "generally easy," the woman being soon able to busy herself about her domestic duties, sometimes even a few hours after the event. Of the Bedouins of the desert Burckhardt[35] said in 1831 "their women suffer but little during parturition and they are often delivered in the open; when this occurs the mother rubs and cleans the child, as soon as it is born, with earth or sand, places it in her handkerchief and carries it home. If she feel the symptoms of labor while mounted on a camel, she alights and is delivered behind the camel, so that no person may see her, and then immediately remounts." In Alaska "the majority of Thlinget women suffer very little, and some not at all, when their children are born. They have been known to give birth while sleeping."[36] Schoolcraft[37] has this to say of the North American tribes: "Parturition, with the Indian female, is seldom attended with severe or long-continued suffering; it is generally very much the contrary, and leads to but a slight interruption to her ordinary pursuits. To linger back a few hours on a journey in the forest, is often the whole time required by the confinement; and there appears in most cases to be but little, if any premonition. A wife has been known to sally into the adjoining forest in quest of dry limbs for firewood, and to return to the wigwam with her new-born child, placed carefully on the back-load. The wife of Saganosh was passing with her husband and family in a canoe, along the precipitous sand-cliffs of Lake Superior, which are called Grandes Sables. There is, in general, but a strip of beach between the precipices and the water, and the scene is nearly as denuded of trees or bushes as the deserts of Arabia. But she landed in haste, and described a few bushes in a depressed spot, which sufficed for her accouchement chamber, and in a few hours was in her canoe again with the newborn babe. Their exemption from the

usual sufferings of childbirth may be said to be the general condition of the hunter state, and one of the few advantages of it which the female enjoys above her civilized sister. But it will be seen to be the simple result in obstetrics of the continued exercise in the open air of the Indian woman, and her consequent hardihood." Again he says: "It is an established rule, that pregnant women be entirely alone at the time of delivery; and this rule is rigidly adhered to. Nature seems to have fortified them with strength to undergo the operation without assistance. On the 12th of December, 1790, four women came from the white ground, ten miles from Little Tallassie, to sell horse-ropes to the beloved man. The day was cold and rainy, with a sleet of snow; they stayed all night. About midnight one of them, a young woman, was taken in travail; her mother was with her, and immediately ordered her to take some fire and go into the swamp, about thirty rods from the outhouse where they slept. She went alone, was delivered of her child, and at ten o'clock next morning, being bare-footed and half-naked, took the infant on her back, and returned home through the rain and snow, which still continued to fall, without the least apparent inconvenience."

Doubtless this kind of testimony might be increased in amount and perhaps in force. On the contrary, many are the instances related of comparatively painless childbirth by civilized women,—women delivered one day who do the family washing the next. Doubtless also, except for conventional usage and prejudice, considerable numbers of the modern women who now languish for weeks under the fluttering care of the monthly nurse, are quite able to be up and around in a day or two after parturition. While this seems all very probable, it is impossible to calculate the number of women, who under such a regime would perish or would be invalided for life. In other words we simply see here, by this analysis, the process at work, with which we are all more or less familiar, in the popular biological discussions of the day,—the selection of the unfit,—that is unfit for life under savage conditions—perhaps not too fit for civilized conditions. It is not worth while to push the argument further but we may at once turn to the evidence to be gathered which points to the conclusion that the wild woman also has her "bad times," to the evidence presented by selection "in the doing." First a conjecture of Avebury from prehistoric evidence: "From the numerous cases in which the bones of an infant and a woman have been found together in one grave, it would seem that if any woman died in childbirth, or while nursing, the baby was buried alive with her, as is still the practice among some Esquimaux families." This may be due to the vicious habits of indolence, charged against the cave woman as against her of the modern boudoirs. Many of the figurines, found in the caverns, where the Cro-Magnon or the Grimaldi race produced the wonders of the Aurignacian era, when of women, depict her in the enceinte state; her corpulent condition in contradistinction to the representations of man, who is never shown as obese, argues Osborn,[38] intimates her highly fat and nutritious diet and her sedentary habits. As for the Esquimaux: "For a certain length of time after a child is born the mother must remain in her own home, visiting no other tupic or igloo. The period for which this limitation holds good varies, sometimes reaching to the length of two months."[39] Doubtless this limitation is a sort of taboo, and little more can be said for our own "lying in" periods. We have seen the sharp line drawn between

the customs of some of the Fiji women and the neighboring Tongans, as related by Williams. The report of Hale[40] would indicate also that differences exist among the Fiji women as to the time allotted for their lying-in period as they do among us. "Parturition is not usually severe, and some women have been known to go to work within an hour after delivery, others, however, remain under the nurse's care for months. It is the prevailing opinion that hard work makes the delivery more easy. After childbirth the women usually remain quiet, and live upon a diet composed of young taro-tops, for from four to eight days, after which they bathe constantly." We shall see that not only, according to Stuhlmann,[41] in the heart of Africa some of the Wambuba women die in childbirth and that postmortem cesarean section is performed in order that mother and child may be buried separately, but according to Felkin[42] in a neighboring tribe cesarean section is performed on the living woman for difficult labor. In West Africa death from delayed labor occurs, but it is looked on as a disgrace. "The body of a woman dying in confinement is treated with contumely and is burned as is everything else belonging to her."[43] The Papuan women, according to Neuhauss,[32] are so fearful of the pains of childbirth that they attempt to prevent the continuation of pregnancy. Some understanding of the anatomical changes, giving rise to severe pain in parturition is entertained by the Chuckchees of Northeastern Asia. "Immediately after the delivery, the body of the woman is tightly bound around the hips with a cord in order to bring the bones of her body in their former position. The Chuckchee believe that, without this, the woman will become sickly, and that her life will be shortened."[44] In some of the North American tribes[45] the most accomplished of the medicine-men practiced a primitive surgery aided by external manipulation and otherwise in difficult labor. Among the Polynesians generally "any difficult case was attributed to witchcraft, and prayers were offered to the spirits of dead ancestors to counteract the spell."[46] Of the Ainu[47] it is said that especial care is given to childbirth and various magical measures are in use to quiet the afterpains. In Schoolcraft's work, Williamson[48] refers to tedious labor among the Dacotah Indians, for which the rattles of a rattlesnake are shaken to stimulate the sluggish energies of the tardy child lingering in his mother's womb. If a woman of the Lushei Kuki clans[49] in India has difficulty in bringing forth, a fowl is killed and magic rites are practiced to help her.

It seems, from this cursory review of the existing testimony, that it is a question of considerable doubt, to say the least, if, given the greater hardihood in the bearing of pain, the lot of the wild woman in her pains of childbearing is less severe than that of her civilized sister. Much has been said of the smaller heads and the larger female pelves of the primitive races of womankind, but the anatomic studies in support of this have been insufficient. The interference of modern science has ameliorated woman's sufferings and often has saved her life, but there is no reason to suppose that other differences than those of environment exist.

REFERENCES

(25) Höfler: Ein alter Heilritus, Archiv für Geschichte der Medizin, 1914, vii, 390 (1163 Eg. bib.). (26) Fiske, John: Myths and Myth-Makers, Boston, J. R. Osgood & Co., 1873. (27) Williams, Thomas: Fiji and the Fijians, London, A.

Heylin, 1858, 2v. (28) Lumholtz, Carl: Among Cannibals, London, J. Murray, 1889. (29) Curr, Edward M.: The Australian Race, Melbourne, J. Ferres, 1886-87, 4v. (30) Roth, H. Ling: The Aborigines of Tasmania, assisted by M. E. Butler and J. B. Walker, ed. 2, Halifax (Eng.), E. King & Son, 1899. (31) Man, Edward Horace: On the Aboriginal Inhabitants of the Andaman Islands, London, Anthropological Institute of Great Britain and Ireland, (1883?). (32) Neuhauss, Richard: Deutsch Neu-Guinea, Berlin, D. Reimer, 1911, 3v. (33) Skeat, Walter William and Blagden, Charles Otto: Pagan Races of the Malay Peninsula, London, Macmillan & Co., 1906, 2v. (34) Brown, George: Melanesians and Polynesians, London, Macmillan & Co., Ltd., 1910. (35) Burckhardt, John Lewis: Notes on the Bedouins and Wahabys, London, 1831, 2v. (36) Jones, Livingston F.: A Study of the Thlingets of Alaska, New York, F. H. Revell Co., 1914. (37) Schoolcraft, Henry R.: Indian Tribes of the United States, Philadelphia, Lippincott, Grambo & Co., 1851-1857, 6v. (38) Osborn, Henry Fairfield: Men of the Old Stone Age, New York, Charles Scribner's Sons, 1915. (39) Hall, Charles Francis: Arctic Researches and Life Among the Esquimaux, New York, Harper & Bros., 1866. (40) Hale, Horatio: The United States Exploring Expedition, Philadelphia, Lea & Blanchard, 1845-6. (41) Stuhlmann, F.: Mit Emin Pasha ins Herz von Africa. Ein Reisebericht mit Beiträgen von Dr. Emin Pascha. Im amtlichen Aufträge der Kolonial. Abtheilung des Auswärtigen Amtes herausgegeben, Berlin, D. Reimer, 1894. Deutsch Ost-Afrika, 1. (42) Felkin, Robert W.: Notes on Labor in Central Africa, Edinburgh Medical Journal, April, 1884, xxix, pt. 2, p. 922. (43) Kingsley, Mary E.: Travels in West Africa, London, Macmillan & Co., 1897. (44) Bogaras, Waldemar: The Chuckchee, Leiden, 1904-09. 3 pts, American Museum of National History Mem., Jesup North Pacific Expedition, Publications, vii, pt. 1 to 3. (45) Hodge, Frederick Webb, ed. Handbook of American Indians North of Mexico, United States, American Ethnology Bureau, Bulletin 30, pt. 1-2, Washington, 1907-10. (46) Brown, George: Melanesians and Polynesians, London, Macmillan & Co., Ltd., 1910. (47) Pilsudski, Bronislaw: Schwangerschaft, Entbindung und Fehlgeburt bei den Bewohnern der Insel Sachalin (Giljaken und Ainu). Anthropos, v, No. 4, 1910, p. 756. (48) Williamson, Thomas S.: Dacotas of the Mississippi. In Schoolcraft, Henry H., Indian Tribes of the United States, pt. 1, Philadelphia, 1851, p. 247. (49) Shakespear, J.: The Lushei Kuki Clans, London, Macmillan & Co., 1912.

Selected Abstracts

The Pathology of Ovarian Neoplasms

Goodall: The Origin of Tumors of the Ovaries. Surgery, Gynecology and Obstetrics, 1920, xxx, 249.

Goodall takes up the origin of epithelial tumors of the ovary and, as a basis, devoted a great deal of time and painstaking work to determine the origin of the epithelial structures of the ovary, most of which are represented in the mature organ only by "rests" due to malformation or, more generally, due to an arrest of normal retrograde changes. His material consisted of human ovaries in all stages of development as well as those of various lower animals. The ovaries of the bitch and cow were found to be especially useful, for in them the fetal structures persist largely to maturity. However, he found this persistence of epithelial structures to vary widely not only between different species, but in various individuals of the same species, and even in the two ovaries of the same individual, especially the human.

That real tumors develop from graafian follicles is doubted by Goodall who agrees with Nagel that "hydrops folliculi" represents nothing more than unusually large healthy follicles. He also doubts that the follicular cells of primordial cell nests ever give rise to tumors.

Parthenogenesis having been established by many investigators, es-

pecially Loeb, the origin of dermoids and teratomata from ova seems established, teratomata having been found only in such locations where aberrant ovarian rests are, at times, encountered.

Since peritheliomata occur eight times more frequently in the ovary than sarcomata, Goodall assumes they originate from the interstitial cells which occupy a position morphologically between the epithelial and connective tissue cells. R. E. WOBUS.

Frankl: Ovarian Carcinoma. Archiv fuer Gynaekologie, 1920, cxiii, 29.

In a paper of more than 100 pages the author presents a most exhaustive discussion of this problem, based on a study of the pathology and clinical course of 65 primary and 23 secondary cancers of the ovary. The wealth of material offered in this article renders the presentation of its contents in form of a short abstract impossible. For the clinician it seems interesting that Frankl is most favorably impressed with the results of x-ray treatment subsequent to operation. Whenever an ovarian carcinoma is suspected a careful search must be made for a possible or probable primary neoplasm in stomach or intestines. The frequency of metastatic growths in uterus and adnexa calls for routine total hysterectomy in every case of ovarian cancer.

HUGO EHRENFEST.

Frankl: Carcinoma of an Ovarian Dermoid. Zentralblatt fuer Gynaekologie, 1920. xliv, 373.

The author found only 60 cases of this sort recorded in literature. His new case exhibits interesting anatomic peculiarities. The presence of locks of hair in three separated cavities clearly established the origin of the carcinoma from multiple dermoids.

HUGO EHRENFEST.

Boettger: Cornification of Squamous Cell Carcinoma of the Ovary. Monatsschrift für Geburtshülfe und Gynäkologie, 1921, liv, 22.

The author reports the case of a woman 59 years old, who had bilateral ovarian tumors; the right mass was as large as a child's head and the left the size of a clenched fist. At operation the former was removed, but because of the discovery of nodules that were apparently carcinomatous metastases, the left tumor was left in situ.

Upon examination the excised tissue proved to be a double tumor; a dermoid cyst undergoing carcinomatous degeneration accompanied by a teratoma of the ovary. In the wall of the former there was very profuse cornification of the epithelial tumor cells.

The question of the origin of the horny layered epithelium is considered in some detail. In the ovary there are present three types of epithelial cells, from which carcinoma can possibly develop: the surface or ovarian epithelium, the epithelium of the follicle, and the cell-foci of Walthard, which probably represent remnants of Pflüger's cell columns. From none of these can a squamous cell carcinoma develop or at least not the form showing cornification. True squamous-cell carcinoma can then only develop from dermoid cysts or from teratomata, or may appear as metastasis from distant organs.

To describe the tumor found in his case the author introduces the

term "Malignant Dermoid", which he defines as a teratoid tumor in which derivatives of all three germ layers are present, but which are distinguished by the absence of a typical dermoid basis as evidenced by the sparse development of hair, teeth and bony tissue.

The older authors are quoted to show the great divergence of views regarding the origin of similar rare tumors. E. D. PLASS.

Eisenstaedter: Carcinomatous Dermoid Cysts of the Ovary. Monatsschrift fuer Geburtshuelfe und Gynaekologie, 1921, liv, 360.

Of 209 ovarian tumors operated upon, 193 were cystic, and only 16 solid. The cystic tumors comprised: 153 benign cystomas, 24 carcinomatous cystomas, 13 dermoids, and 3 carcinomatous dermoids. Of the 16 solid tumors 2 were fibromas, 1 sarcoma and 4 carcinomas. Thus in a total of 16 dermoids 3 were shown to be carcinomatous. They are described and discussed in this paper. The author accepts O. Frankl's classification of the genesis of cancerous dermoids. They comprise the following types: (1) The carcinoma develops within the dermoid, or (2) it transgresses from the remaining ovarian tissue into the dermoid. In the first group the carcinoma is as old as the dermoid or developed later, primarily in it or metastatically. In the second group the growth proceeds either from a primary solid ovarian carcinoma, or from a malignant adenocystoma, or it represents a metastasis.

HUGO EHRENFEST.

Benthin: Unusual Radiotherapeutic Observations. Monatsschrift für Geburtshülfe und Gynäkologie, 1921, liv, 34.

Benthin recites several unusual results apparently resulting from x-ray therapy in malignant conditions.

In the first case the patient had been given nine radium treatments and sixteen x-ray applications, following vaginal hysterectomy for carcinoma of the cervix. Two years later there appeared an ulcer of the rectum. The next year a multilocular ovarian cyst showing carcinomatous degeneration was removed.

The second patient had a vaginal hysterectomy for cervical carcinoma and eighteen months later came to the clinic for radiation because of a recurrence. Intensive treatment continued over four months and was followed by an improvement of the local conditions. An ovarian cyst appeared, however, and grew so rapidly that it was removed and showed marked carcinomatous degeneration. Death occurred within a few months from metastases.

It seems that in these cases the raying of the pelvic tissues bore an etiologic relation to the subsequent development of the ovarian carcinoma.

A third patient had marked pigmentation of the entire body after x-ray and radium treatment following operation for ovarian carcinoma.

The fourth patient was x-rayed in an attempt to control a very severe menorrhagia but in spite of heavy doses there was only a slight effect on the condition and during the three years of intermittent treatment the patient twice became pregnant and bore healthy children. This would indicate a great individual variation on the part of the ovarian tissue to the action of the x-rays. Other authors, Hei-

mann, Baisch and Werner have reported similar cases in which pregnancy occurred in spite of x-ray treatment to relieve metrorrhagia.

The last case developed a "radium ulcer" of the rectum after treatment following operation for malignant disease. Examination of the base of the ulcer showed no evidence of carcinoma. E. D. PLASS.

Reel: Krukenberg Tumor of the Ovary. Annals of Surgery, 1921, lxxiii, 481.

Fibrosarcoma ovarii mucocellulare carcinomatodes was first described by Krukenberg in 1896. Since then 56 additional cases have been recorded. In 20 of these, including Reel's case, the primary growth was situated in some portion of the gastrointestinal tract.

The case here reported occurred in a white girl of 21. She was quite well until symptoms suddenly appeared which indicated some acute abdominal condition. The ovarian tumors, as is frequently the case, were bilateral. The initial lesion was probably in the stomach, metastases being found widely distributed.

The patient lived for two months after removal of the ovarian tumors, no attempt having been made to remove the primary focus.

R. E. WOBUS.

Major: A Study of the Krukenberg Tumor. Surgery, Gynecology and Obstetrics, 1918, xxvii, 195.

Major analyzes the cases of this type heretofore reported and adds an observation of his own. The patient was a colored woman of 40 who came to autopsy after having died from progressive weakness, having lost 80 pounds in weight. The ovaries were the seat of nodular tumors, each about 7x9x7 cm. The anterior surface of the shrunken stomach was covered by wart-like tumors. An enlarged lymph-gland was found at the hilus. A few small tumor growths were seen on the jejunum, but the liver was not involved. Careful study revealed the presence of occasional groups of tumor cells in the pulmonary vessels; in a few places these cells had grown into the lung tissue, forming microscopic metastases.

Major feels that the tumor is essentially a carcinoma which is, in the majority of cases, secondary to carcinoma of the stomach or intestines. The original tumor being a slowly growing scirrhous growth, may be easily overlooked. Surface infection may explain the metastases, but his finding of cells in the blood vessels suggests a spread by way of the blood stream. R. E. WOBUS.

Chapman: Krukenberg Tumor. Surgery, Gynecology and Obstetrics, 1920, xxxi, 58.

A girl of 14, who had menstruated once two months previously, was suspected of being pregnant on account of a rapidly growing enlargement of the abdomen. Examination disclosed what appeared to be a lobulated ovarian tumor extending almost to the ensiform. At operation there were found two tumors of almost equal size, one originating from each ovary, weighing six and seven pounds respectively. Microscopic section showed a diffuse myxomatous structure with liquefaction areas and the typical signet ring cells, the whole picture being

that of the "Gallert Krebs" first described by Krukenberg. A tumor the size of a silver dollar was found in the anterior wall of the stomach, probably representing the original focus. Enlarged lymph glands were encountered in the gastrocolic omentum.

Although the child recovered from the operation she died 20 days later, apparently from exhaustion. R. E. WOBUS.

Kynoch: Primary Chorionepithelioma of the Ovary. Edinburgh Medical Journal, 1919, xxii, 226.

Primary chorionepithelioma of the ovary is rare and some authorities consider the ovary to be by far the most unusual site for the extrauterine development of this type of malignant tumor. A paper of Fairbairn (published in Jour. of Obst. and Gynec., British Empire, July, 1919) covered this subject thoroughly, discussing a personal observation and two very similar cases from Doederlein's clinic. Kynoch's additional case pertains to a nullipara, age 24, who after an amenorrhea of eight weeks had bled persistently for six weeks. A large, nodular left ovary of dark purple color was removed. It proved to be a chorionepithelioma. A month later a soft tumor was discovered in the abdominal scar, regarded as being a hematoma. After a few attacks of vomiting and diarrhea the patient died about three months after the first operation. A large metastatic growth filled the pelvis, smaller metastases were also found in the lung.

It was impossible to determine whether the chorionepithelioma had developed from a previous pregnancy or from a teratoma of the ovary.

HUGO EHRENFEST.

Glynn: A Comparison between Ovarian "Hypernephroma" and Luteoma and Suprarenal Hypernephroma, with Comments on Suprarenal Virilism. Journal of Obstetrics and Gynaecology of the British Empire, 1921, xxviii, 23.

Nearly 40 years ago Grawitz first propounded the theory that certain renal neoplasms were developed from misplaced "rests" of the adrenal cortex. These neoplasms were subsequently named hypernephromas.

Peham (1899) described a large solid tumor of the ovary, which on account of its macroscopic and microscopic appearance, and the supposed occurrence of suprarenal cortical tissue in the ovary, he called "hypernephroma." Several other cases of this sort have since been published. In the last few years, however, the ovarian "hypernephroma" theory has been abandoned by many authorities who regard these tumors as derived from lutein cells, or at least not from the suprarenal cortex.

From a most careful study of all the available material Glynn concludes that it is very doubtful whether a single case of genuine ovarian "hypernephroma" has yet been recorded. For this doubt he advances a number of additional reasons which so far have escaped the notice of critics.

1. *Embryological.* Suprarenal cortical tissue is frequent in the broad ligament, yet there is no proved case of its presence in the ovary.

2. *Histological.*—The large ovarian "hypernephromas" are unlike the

large primary, and usually malignant, growth of the cortex of the suprarenal gland itself; but they are usually, clinically and structurally, like other large tumors described as lutein growths.

3. *Clinical.*—The large ovarian "hypernephromas" are not associated with the changes in secondary sex characteristics, as hirsutes, etc., which are so frequent with suprarenal cortical tumors in young children, especially girls, and in women before the menopause. These sex changes, on the other hand, never occur with lutein tumors.

There is, however, one case on record of the much rarer hypernephromas of the broad ligament—a locality where accessory suprarenals are common—which did cause changes in sex characters, and histologically appeared like a true suprarenal hypernephroma. HUGO EHRENFEST.

Herzog: Melanosarcoma of the Ovaries. Zeitschrift fuer Geburtshilfe und Gynaekologie, 1918, lxxx, 576.

Melanosarcomas, the most malignant neoplasm in human pathology, are found in the ovaries almost only as metastases in cases of general melanosarcomatosis. However, there are a few instances of primary affections of the ovaries on record, of which Soubeyran and River, in their latest compilation, mention seven. Since that time Cottam and Markus each have added one more case. According to Frankl literature contains reports of 40 cases of secondary ovarian melanosarcoma. In the opinion of Herzog doubt may be raised against the genuineness even of these 9 presumably primary growths. Only the two cases of Amann and Lorrain, respectively can be accepted. In them the sarcoma developed from a teratogenous skin "anlage" in the ovaries. Most probably all melanomas originate from tissue which contains pigmented cells, mostly from cutaneous nevi. The secondary ovarian melanosarcomas, like in the two cases now recorded by him, appear as a rule in two types: a large, homogenous tumor completely substitutes the ovary, or the ovarian tissue contains disseminated small tumors. Pregnancy markedly favors the growth of this neoplasm, and under these conditions the ovaries exhibit a distinct predisposition for the development of metastases. HUGO EHRENFEST.

Young: Primary Echinococcal Invasion of the Ovary, with Notes on other Pelvic Hydatids Collected from Various Sources in Australia. Journal of Obstetrics and Gynaecology of the British Empire, 1914, xxvi, 207.

Primary hydatids of the ovary have been especially studied by Bland Sutton, who found all available records unreliable. He considers that the immunity of the ovary (and also of the testis) to hydatid invasion is due to the fact that it lacks a loose serous investment. The case of the ovary is particularly deceptive, since hydatids arising in the broad ligament tend, by their progressive enlargement, to stretch the ovarian tissue along their periphery. However, a true case of hydatid of the ovary has been reported by Jéan, and another observation of this sort is claimed by Allen.

Young also feels sure that in his case the right ovary alone was the seat of a hydatid cyst, between 7 and 8 cm. in diameter, with several exogenous daughter cysts in its wall.

In response to an inquiry among surgeons throughout Australasia Young received notes concerning a number of observations, hitherto unpublished, which he presents in this paper. HUGO EHRENFEST.

Forgue and Chauvin: Tuberculosis of Ovarian Cysts. Revue de Chirurgie, 1919, xxxviii, 881.

The writers state that only 35 observations of this occurrence have been recorded in literature. Tuberculous ovarian cysts can be divided into three separate groups: (1) Tubo-ovarian cysts, really tubo-ovarian tuberculous abscesses; (2) Ovarian Cysts with an external infection with tuberculosis, usually associated with a tuberculous peritonitis, and (3) Ovarian Cysts with infected contents. In this form the ovarian infection practically never is primary, the primary focus as a rule being found either in the peritoneum or the tube. HUGO EHRENFEST.

Aimes: Torsion of Ovarian Cysts. Progrès Médical, 1920, Number 45, p. 483.

Aimes considers the various aspects of ovarian cysts with twisted pedicles. From the study of the literature, since no personal cases are cited, he finds that there are no reliable statistics regarding the frequency with which the pedicles of such cysts may be twisted. The accident may occur at any age, being more frequent between the ages of 25 and 50, presumably because more cysts occur during these age periods and since the causes of the twisted pedicles operate more frequently during these years.

Torsion occurs more frequently with movable than with adherent cysts. The same is true of small in comparison with large cysts. It naturally follows that the pedicles of dermoids are more frequently found twisted than is the case with the mucoid variety.

The causes of movement of these ovarian cysts are of either external origin, from conditions giving rise to a rapid change in the equilibrium of the abdominal cavity or of internal origin from a change in volume of the surrounding organs. The rotatory motion necessary to produce this twist may be explained by the fact that when forces are applied tangentially to the surfaces of symmetrical organs such a motion results. Also it is well-known that a spheroid body when compressed between two movable points will tend to rotate. On the other hand if the cyst is not symmetrical there will be a tendency to rotation because of the unequal enlargement of its various parts. After rotation has begun and the veins of the cyst become congested, increased rotation results because the congested veins tend to form arcs which exert a twisting force.

Torsion occurs most frequently in right-sided cysts. These tend to rotate in a clockwise direction while those of the left side rotate in a counter-clockwise manner. Pathologically, twisted cysts of the ovary present a picture of venous stasis or gangrene, depending upon the completeness of the rotation and the consequent interference with the blood supply. There is an accompanying peritoneal reaction which, in the greater percentage of cases, is aseptic.

The clinical picture varies from that of intense pain and severe shock to that of slight recurring attacks of generalized abdominal

pain, dependent upon the acuteness or chronicity of the process. The more common condition with which twisted cysts of the ovary may be confused are: twisted pedunculated fibroids; interstitial hemorrhages in fibroid tumors; torsion of a hydrosalpinx; ectopic gestation; and acute appendicitis.

Aimes finds the mortality to be about 7.6 per cent attributable more often to peritonitis than to hemorrhage, these two conditions being the complications of greatest danger. Palliative treatment may be applied but the only curative treatment is the removal of the cystic mass by operation. THEODORE W. ADAMS.

Downes: Tumors of the Ovary in Children. Journal American Medical Association, 1921, lxxvi, 443.

Eighty-six cases of ovarian tumors in girls 10 years and younger have been reported to date. A large number of these are malignant. Downes thinks they are frequently overlooked. He reports the successful removal of a simple cyst containing 2.5 liters of fluid from an infant 7½ months of age in whom the condition had been mistaken for Hirschsprung's disease. R. E. WOBUS.

Harley: A Case of Ovarian Cyst of Unique Dimensions. Indian Medical Gazette, 1921, lvi, 18.

Harley reports a case of ovarian cyst in a Hindu coolie, age 40, who gave a history of a small swelling in the lower abdomen gradually increasing in size for fifteen years. Her menstruation was regular up to four months before seen. Slight dyspnea; heart displaced upward; slight edema of legs. Abdomen very large, skin stretched and thin, with veins in it very prominent. No distress on lying down. Circumference of abdomen 73 inches. Urine normal and digestion good. Weight 246 lbs.

She was operated on; an incision was made 30 inches long. The cyst was found adherent to the parietal peritoneum, bowels, diaphragm and liver. The round ligament was the size of a loop of small bowel. The sac was isolated after considerable difficulty with very little bleeding and the patient seemed to stand operation very well. Weight of patient after operation 82 lbs. She died next day of shock due, apparently, to too much handling of peritoneum. F. J. SOUBA.

J. Mason Hundley and Jack M. Hundley: A Report of Two Ovarian Cysts. Official Publication of the University of Maryland. Bulletin of the School of Medicine, 1921, v, 182.

These cases are especially interesting because of the size of the cysts. In the first patient, a colored woman of 54 years, a cystadenoma of right ovary was found which weighed 102 pounds. During the removal of the cyst one hundred pints of a greenish colored fluid were emptied. The patient convalesced rapidly and left the hospital 14 days after the operation.

The second case was a dermoid cyst weighing seventeen and one-half ounces occurring in a colored child eighteen months of age. The child made an uneventful recovery following operation.

NORMAN F. MILLER.

Book Reviews

The Endocrines.—By Samuel Wyllis Bandler, A.B., M.D., F.A.C.S., Professor of Gynecology in the New York Post-Graduate Medical School and Hospital. Philadelphia, W. B. Saunders Company, 1920.

The aim of the work as stated in the preface is to present the basic principles of endocrinology together with their application to practical problems that confront the physician. His theory, he states, is mainly derived from clinical observation and the record of an experience with gland therapy over a period of twenty-two years. The scope of the book is considerable, inasmuch as the author believes that heredity, development, normal function of the nervous system and mind are all intimately dependent on the ductless glands.

At the present moment when facts concerning the endocrines have accumulated to such an extent that but few can be sufficiently acquainted with them to discover their applicability in practice, a working theory that is carefully founded would be acceptable even if it cannot be more than provisional. A. Biedl has done much in the matter of sifting the existing experimental data on animals critically in his careful work on internal secretions. A number of other investigators have added to these efforts. But of clinical studies and observations in the human subject, carried out in a painstaking manner, recorded in detail and accurately tabulated, there is a great dearth. Any contribution in this direction therefore must be worth while. When Bandler says in his book "these opinions are offered on the basis of therapy fortified by clinical observations," or again "if you have a theory and it works out in practice, the chances are that it is correctly founded," the hope is awakened that a series of therapeutic tests with organic extracts carefully arranged and reviewed, is to be presented by the author, but in this one is greatly disappointed.

Dr. Bandler's book, while it aims to focus attention on gland treatment, if taken literally, gives a very much exaggerated idea of the scope and value of this form of therapy. Probably this is due to the fact that a larger part of the subject matter is taken directly from the lecture room where the personality of the teacher is known and due allowance could be made for attempts to impress certain points or hold the attention of the hearer. The following extracts will serve to elucidate my meaning.

Pages 393-394. "She had a fibromyomatous uterus containing five or six separate fibroids, reaching to the umbilicus—reaching way over the pelvic brim so that I could not get my finger between it and the pelvis." * * * "so we gave her 7 grains of mammary extract, and a grain or two of the anterior lobe of the pituitary, —and after six months there was not a nodule in that uterus as large as my fist. That is not only one experience; I have had many such." * * * "I am telling you what gland extracts will do, and you can use them in cases where you don't want to operate, * * * and if you give these medicines for three or four months you may often have a uterus one-third as large as it was, even in that short time." It need hardly be commented that no one who claims to teach gynecology should make such a statement as this without being in a position to submit the most painstaking clinical records to substantiate it.

Page 336. "Exophthalmos is, in my opinion, an evidence of overactivity of the posterior pituitary."

Page 383. "Many of my pregnant patients have a transient glycosuria which disappears, and I have considered most of them as pituitary in nature."

Page 321. "Whether this overactivity of the pituitary has anything to do with gallstones, I do not know. I believe this to be the case. We do however, observe frequent association between fibromyomata of the uterus, the postpartum period, and stones in the gall bladder." All these statements in reference to increased pituitary function strangely enough remain unaccompanied by the results of exact laboratory tests to prove that a hyperactivity really exists in a given case; the sugar tolerance test, for instance, is not even mentioned.

In characterizing individual glands the anterior lobe of the pituitary and adrenal cortex are designated as essentially male glands showing a preponderating development and influence in the male in conjunction with the secretory tissue of the testes; while the pituitary posterior lobe and the thyroid on the other hand are assumed to play a larger rôle in the female. Where a few other authors have in fact held that there is a close relationship between the adrenals and certain emotions as fear and anger, Bandler goes much further in accrediting the one emotion to the medulla, and the other to the influence of the cortical portion of this gland. There are no comparative anatomic and histologic studies cited in the text to prove that actual and measurable differences exist in these glands between the male and female.

In reference to pregnancy the author says "I have frequently noted that many patients who are not nauseated are quite drowsy and sleepy. I am accustomed to tell such sleepy patients that this is a favorable sign as nausea is not a probable annoyance from which they will suffer." * * * He also states "women whose menstruation occurs at thirty-five day intervals are in need of endocrine stimulation, they are more likely to begin labor at a date later than estimated." How helpful it would be if Bandler proved this to be correct.

On page 331, the symptoms and signs suggestive of endocrinal disturbance are grouped to help in clinical observation; but in order to safeguard against error in their interpretation, those which have been thoroughly established should be treated separately from those which are not.

Of the cases (pages 397 to 475) finally cited to furnish the basis for the author's conclusions, a considerable number must be eliminated as inconclusive because the period of observation is too short, less than three months, and often only several weeks. In a second group, definite conclusions cannot be drawn about any particular preparation because a number of substances are administered at the same time and the therapy is frequently changed. In a third group the exact duration of treatment is indefinite or not mentioned; neither is any allowance made throughout for the numerous sources of error in interpreting a patient's report.

Generally speaking the book is original in the manner in which the subject is dealt with, and may even help to stimulate observation along certain lines, but, unfortunately the author often expresses himself with a finality which is certainly not justified by the data which he submits; and, coming as they do from a teacher in gynecology, some of his assertions may be distinctly misleading.

FREDERICK E. NEEF, M.D.

Extrauterine Pregnancy.—By EDWARD A. SCHUMANN, M.D., Lecturer on Obstetrics, Jefferson Medical College; Gynecologist and Obstetrician to the Philadelphia General Hospital, etc. With 71 illustrations. Gynecological and Obstetrical Monographs. D. Appleton and Co., New York and London, 1921.

It was a pleasure to read this book and it is a privilege to recommend it to others. Authors of monographs have this advantage over textbook writers that they need not anxiously consider the available space. Schumann, however, has not abused

his opportunities; nowhere in this attractive volume of 189 pages does he appear verbose or use "padding" to fill his pages. On the contrary, the book contains a wealth of material from the author's own studies and careful observations, and from judicious reading of the literature. That he pays particular attention to American views (as stated in the preface) and leaves aside some of the more recent contributions from England, France, and Germany, may, at first sight, give the impression of a somewhat narrow nationalism in medicine; but, on second thought, the fundamental ideas on so important a question as ectopic pregnancy, have so frequently been exchanged between the various nations, that it makes little difference which literature is consulted. And it may further be said that this book not only contains all that is of consequence, but that it presents the subject in so clear and fluent a language that the attention of the reader is held from the beginning to the end.

Of the rich contents, only a few points can be mentioned—enough, however, to indicate how valuable this monograph will be to anyone who wishes to familiarize himself thoroughly with the subject.

The opening chapter on the history of extrauterine pregnancy leads the student from the first recorded case about the middle of the eleventh century to the inception of modern methods of treatment and gives an excellent exposé of the gradual growth of understanding of the gravity of the condition and the development of means to combat it properly. The history of medicine is interesting at all times, and this fascinating chapter is exceptionally well told. (The reviewer would interpolate here that Abraham Cyprianus, in 1694, in operating for tubal pregnancy, was the first to make use of what is now called the Trendelenburg position so as to prevent the extrusion of intestines.)

The second chapter deals with the frequency and causes of ectopic gestation. Schumann found that in Philadelphia, in 1918, there was one extrauterine to 303 intrauterine pregnancies—a marked increase of the former which is partly fictitious as it is due to improved diagnosis; but there is also an actual increase because, "as conservative gynecologic operations become more popular, so will subsequent ectopic gestations become more common, since previous pelvic operation is so usual an event in the history of these cases." Among the various causes, obstruction of the tubal lumen from within seems to underlie the vast majority of all tubal pregnancies. It does not occur in the presence of acute or subacute salpingitis but it does take place when the inflammatory process is subsiding, "and it is fair to assume that, had the ectopic pregnancy not developed at this time, the tube would probably have become completely healed within a few years, thus permitting the fertilized ovum to reach the uterus."

In Chapter III, dealing with the termination of extrauterine pregnancy, the author is of the opinion that the ovum is absorbed much more frequently than is commonly believed. As to other modes of termination, rupture occurs with nearly double the frequency of tubal abortion.

The Anatomy and Pathology in Chapter IV has been of particular interest to the reviewer. The various theories regarding the implantation of the ovum in the tube are here discussed in full. Conclusions based on animal experiments are valueless, says the author, as no true case of tubal pregnancy has ever been found in the lower animals. The description of the histologic changes in the affected tube is well supported by good drawings of which the entire book abounds. The valuable work of Sampson is fully considered in this chapter. The author observed three cases of interstitial pregnancy in one of which the unusual evacuation of the fetus through the uterine cavity took place. True ovarian pregnancy, according to Schumann, is not as excessively rare as has been thought in the past; these cases probably terminate early and are dismissed with the diagnosis of ovarian hematoma after a cursory microscopic examination.

The following chapter on recurrent extrauterine pregnancy gives due prominence to the important studies of Richard R. Smith and others. The author rejects the proposition to uniformly remove the nonpregnant tube as a routine procedure in operating for tubal pregnancy.

The chapter on diagnosis and symptomatology is admirable and deserves to be read with the utmost concentration. It dispels the myth still current among practitioners that tubal gestation can never be diagnosed before rupture, though occasionally the correct differentiation from other conditions may meet with difficulties.

In the final chapter, the author presents his personal attitude regarding treatment and submits his management of the various phases of the condition. In a general way it may be said that Schumann sees in shock from intraabdominal hemorrhage no contraindication to immediate operation and warns against Robb's teaching to wait until reaction has occurred. Prompt abdominal intervention in any stage of the disease is the keynote of the author's attitude, and one is reminded of the famous dictum by Werth, in 1887, that ectopic pregnancy must be considered as a malignant new growth which should be attacked without delay whenever and wherever it is encountered. The vast improvement in results as expressed by accurate statistics fully justifies such prompt action; and this review cannot be better concluded than by quoting the author's own closing paragraph: "It has been said in high places that there is no excuse for the existence of gynecology as a surgical specialty, but to him who has read this book, the question is left, as to whether or not a branch of medicine which has within a half century reduced the mortality of so dreadful an accident as the rupture of a gravid tube, from 80 per cent to 4 per cent, has not justified its existence in full."

GEORGE GELLHORN.

Menstruation and Its Disorders.—By EMIL NOVAK, A.B., M.D., F.A.C. S., Instructor in Gynecology, Johns Hopkins University, Baltimore. Obstetrical and Gynecological Monographs. With 40 illustrations. D. Appleton and Company, New York and London, 1921.

This interesting book which constitutes the introductory volume to a recent series of specialists' monographs is devoted to all phases of the subject, both normal and abnormal. At the same time the effort has been made to give a practical aspect to the volume so that it will be of interest and value to the practitioner. For this reason the surgical treatment of the various forms of pelvic disorders which are associated with disturbances of menstruation, has not been considered, for, as the author wisely states, this would mean the inclusion of a treatise on operative gynecology. A great deal has been learned about the nature and mechanism of the menstrual phenomenon during the last two decades and this knowledge is an important factor in the more intelligent treatment of the disorders of menstruation which constitute a considerable portion of the ailments to which women are subject. The histology of the endometrium as developed particularly by Hitschmann and Adler has revolutionized our former ideas and this has had its effect on treatment in so far that unrestrained resort to the curette in all menstrual disorders had been greatly reduced. The close relation which has been found to exist between the pelvic organs and the endocrine system has led to the opening of an entirely new field of research which, however, is still in the uncertain and formative stage. Not only the ovary but the thyroid, pituitary, suprarenal, thymus and mammary glands have been drawn into the discussion of menstrual physiology and pathology. Organotherapy has been developed to such an extent in the treatment of menstrual disturbances and the results have occasionally been so brilliant that

disappointment must naturally result from the indiscriminate employment of the endocrine substances. The author wisely cautions against such indiscriminate drugging and shows that we are still in the speculative and experimental stage of the subject.

The chapter on the treatment of menstrual disorders by radium and x-ray has been contributed by Drs. Kelly and Burnham who have done so much work in this field that their statements may be accepted with authority. Undoubtedly the benefits derived from the use of radium in menorrhagia are of great value and importance.

Dr. Novak's book constitutes as far as we know the only contribution to this important subject in the English language and is therefore deserving of attention by the profession. No doubt it will be widely read and deserves to be favorably commented upon.

The Difficulties and Dangers of Obstetric Practice.—By COMYNS BERKELEY, M.A., M.D., M.C., Cantab., F.R.C.P., Lond., M.R.C.S., Eng., and Victor Bonney, M.S., M.D., B.Sc., Lond., F.R.C.S., Eng., M.R.C.P., Lond. Third edition. With 309 illustrations. P. Blakiston's Son & Co., Philadelphia, 1921.

This popular book has undergone its third revision within a comparatively few years, which bespeaks its popularity. A chapter on the feeding of infants has now been added, though one may wonder what this subject has to do with the "difficulties and emergencies of obstetric practice." The authors consider in a satisfactory manner the usual disorders of pregnancy and follow this up with detailed accounts of labor and its complications, together with the ordinary and extraordinary obstetric operations. The book is very satisfactorily illustrated and this is a feature which adds much to its value, especially in the differential diagnosis of a variety of conditions. In commenting on the illustrations, one cannot but express some doubt, however, as to the possibility of the gymnastic performance shown in Fig. 2, which is the position favored by the authors for bimanual examination but which must be distressing to the patient. The book contains a wealth of material and affords an excellent résumé of the differential diagnosis of the treatment of a large variety of obstetric conditions. It may be of interest to refer specifically to certain methods of treatment advocated by the authors. In inevitable miscarriage there is recommended after dilatation with graduated sounds and removal of the uterine contents, the administration of an intrauterine douche of 1-4000 bichloride (?) at a temperature of 115°F. followed by uterine packing if there is bleeding; otherwise by vaginal tamponade. It has been amply proved that intrauterine douching is a source of danger because the fluid may find its way through the fallopian tubes into the general peritoneal cavity. In addition the intrauterine pack is usually employed in order to avoid undue hemorrhage even if none is present at the time of operation; whereas the vaginal pack merely obscures the symptoms of the same. Although the authors do not advise the curette in cases of sepsis complicating abortion, the restrictions might with advantage have been made somewhat stronger. In the treatment of bleeding from placenta previa, vaginal packing is also recommended as a temporary expedient but the extraovular insertion of the dilating bag is not advised, contrary to the favorable experiences reported within recent years by several American observers. In postpartum hemorrhage the routine use of ergotin or pituitrin is favored but pituitrin as a prophylactic before delivery of the placenta is not referred to except in cases where there is a history of previous bleeding, when they recommend that

ergotin or pituitrin be given just as the head is being "crowned." It seems to us that this is rather a doubtful and dangerous recommendation.

The chapter on puerperal fever is very complete and the treatment quite radical. Digital exploration is recommended in most cases while the dangers of the curette are amply discussed. The intrauterine douching is not advocated as freely by the authors as in their treatment of abortion. In the discussion of anesthesia during labor preference is given to chloroform. The personal observations made by one of the authors on 200 cases of twilight sleep seem to make him rather doubtful of its value, as labor was prolonged, the use of forceps more often necessary, the percentage of uterine rupture higher and the failure of occiput posterior positions to rotate normally was commoner. The necessity of very careful personal observation of the patient is insisted on.

The chapter on obstetric operations is very complete and the descriptions of the various forceps operations most satisfactory. The authors seem to favor the axis traction instrument in most of the cases. Notwithstanding the fact that the left lateral position for forceps delivery is so commonly employed in England, the authors favor the lithotomy posture.

In discussing cesarean sections the preference is shown for the classic operation with the incision in the midline below the umbilicus and the uterus is not eventrated. For sewing up the uterine wall a form of mattress suture is recommended. Among extraperitoneal operations the authors limit themselves to the descriptions of Sellheim and Latzko's methods as being the most suitable.

One is rather surprised to find that the important subject of the toxemias of pregnancy is included in a chapter labelled "disorders of the urinary tract." The description of this important complication of pregnancy might well have been extended. References to the conservative methods that are meeting with increased favor are not sufficiently elaborated and the surgical methods of delivery are apparently given the preference. Eclampsia is not a disorder of the urinary tract although albuminuria may be the chief symptom in a prepondering number of cases but the inclusion of the description under this heading affords a mistaken idea as to the underlying etiologic factors.

Book Notices

Acknowledgment is made of the receipt of the following books, selected reviews of which will appear in early numbers.

DAS PROBLEM DER FRUCHTABTREIBUNG VOM ÄRZTLICHEN UND LEGISLATIVEN STANDPUNKT. By Dr. med. Franz Kisch, Berlin, 1921, Urban and Schwarzenberg.

DIE PROPHYLAXE UND THERAPIE DER ENTEROPTOSE. By Prof. Dr. Ludwig Knapp, Berlin, 1921, Urban and Schwarzenberg.

DÖDERLEIN-KRONIG OPERATIVE GYNÄKOLOGIE. Fourth Edition. Revised by Dr. Albert Döderlein. With 455 Illustrations. Leipzig, 1921, Georg Thieme.

Correspondence

To the Editor,

American Journal of Obstetrics and Gynecology.

Sir:

I beg to call the attention of the profession to a method of attacking the problem of the cystocele and to suggest the employment of the subjoined technic to those who may be interested. It requires a fairly long series of cases before any definite conclusions may be reached, and it is my hope that with more operators interested the series of cases will increase rapidly.

The technic proposed is as follows:

1. Operation only to be attempted in cases where laparotomy is indicated.
2. No vaginal work on cystocele.
3. Low abdominal incision, Pfannenstiel or median.
4. Uterus pushed into retroversion.
5. Bladder fold of peritoneum separated from anterior uterine wall as in ordinary hysterectomy.
6. Bladder pushed off uterus by gauze aided by separation of fibrous attachment with scissors.
7. When lower edge of bladder attachment is reached, the separation is to be continued along the anterior vaginal wall, until the entire bladder is free to the urethra (almost) and laterally to the margin of the broad ligaments.
8. Bladder held forward against symphysis by a Deaver retractor and the pillars and torn fascia of the anterior vaginal wall sutured to the fascia along the rami of the pubes exactly as in vaginal procedures save that the mucosa is intact.
9. The cystocele having been obliterated the bladder is sutured to the anterior uterine wall by a few interrupted sutures of fine catgut, the bladder being fastened slightly higher on the uterus than before.
10. Uterus elevated by any standard procedure.
11. Abdomen closed.

On inspecting the cystocele from the vaginal side the mucosa will be seen to be thrown into a series of deep longitudinal folds. These smooth out and disappear within six months. The operation has been done by me for about one year with apparently good results so far.

Edward A. Schumann.